COMPUTERWORLD

Confused developers try to untangle Win32 web

By Michael Vizard
REDMOND, WASH.

As corporate and independent developers begin planning their application development strategies for 1994 and beyond, many said they are becoming lost in a maze

Development dilemma

Model	Function	Application Deployment*
Win32s	Allows applications to run on Windows 3.1 and NT by not supporting multithreading, security and SMP.	1993
Win32	Supports all Windows NT platforms.	1994
Win32c	Optimized for apps targeted at Windows 4.0 or Intel; not expected to include multithreading or SMP.	1995

*Expected

of conflicting Windows road maps. They cited the proliferation of Microsoft Corp. Win32 developer's kits.

Microsoft has left many developers concerned about picking the wrong development environment, which could have serious conse-

quences for their future business plans.

"There isn't really a good channel for plugging into where Microsoft is going. We're kind of surprised to find out how hard it is to find out where the next shoe is going to drop," said Bill Niffin, a developer at Varitec Corp. in Birmingham, Mich., which specializes in creating applications for the health care industry.

According to Microsoft, about 75% of the applications being built today for its 32-bit Windows NT operating system are being constructed using the Win32s kit. That kit is a subset of the full Win32 kit that allows Windows applications to run on both the 32-bit Windows NT and 16-bit Windows 3.1 platforms.

The Win32s kit does not support some of the more complicated programming constructs, such as multithreading on reduced instruction set computing platforms

IS to gain app control
Microsoft adds macro language to integrate its packages

By Michael Vizard
NEW YORK

Microsoft Corp. will preview a common macro language this week that was designed to help information systems shops regain a modicum of control over the thousands of PC applications dispersed throughout their organizations.

While IS managers are happy to see progress in the area of application integration, there is some concern that Microsoft's offering is unavailable to third parties to incorporate into their own applications. But Microsoft's common macro language will link to third-party applications through its Object Linking and Embedding facili-

ty, which includes an OLE Automation utility that allows one application to take control of another.

The arrival of the common macro language, which Microsoft Chairman Bill Gates will showcase running on forthcoming versions of his company's Excel spreadsheet and Project project management software at PC Expo, heralds the beginning of a Microsoft push to tightly integrate its application software [CW, May 31].

Based on the company's Visual Basic programming language, Microsoft's common macro language is called Visual Basic programming systems, Applications Edition, and is intended to give IS managers a tool for building mac-

PC EXPO

Sun boosts net management

By Elisabeth Horwitt
MOUNTAIN VIEW, CALIF.

Sun Microsystems, Inc. is preparing to fight off IBM and Hewlett-Packard Co. encroachments on its network management turf. Sun will go on the offensive with a salvo of help features aimed at the less SNMP-savvy user, a company spokesman confirmed last week.

In the works are a user interface based on the Open Software Foundation's Motif, as well as more functional utilities for managing different applications and views of the enterprise

network, according to Steve Borcich, product development manager at Sun.

The late summer announcements, Sun hopes, will satisfy some long-term user rumblings and help extend the company's reach beyond the OEM market and its workstation base into end users' multivendor networks.

The enhancements will come none too soon if SunNet Manager is to compete effectively with HP's OpenView and IBM's NetView/6000 for a place on the short list for corporations now shopping for enterprise network manage-

Spindler likely to prune Apple orchard

By James Daly
CUPERTINO, CALIF.

■ The ascension of Michael H. Spindler to chief executive officer at Apple Computer, Inc. is expected to have serious repercussions on the Macintosh line and could sound the death knell for products yet to be released.

Spindler, a workmanlike leader, replaced the more visionary John Sculley as CEO 10 days ago [CW, June 21]. He is expected to sharply pare some of the ex-

pansive research and development programs that have cut into Apple's overhead and expense structure, analysts said last week. Apple insiders said as much

as $150 million of the firm's $600 million R&D budget may be chopped.

In addition, analysts predicted that anywhere from 1,000 to 2,000 people in Apple's 14,000-member work force may lose their jobs in layoffs during the coming weeks. Apple officials declined to comment on the report.

Sculley's shift "is

CW Report: Portable computing
Invisible staffs and other mobile mysteries

With more people working off site, you may soon find yourself in the empty corridors of "the virtual corporation," where employees are located wherever they're most productive. How do you manage people you never see? Experienced users offer advice in our Management section.

Mass mobility also creates technology challenges. In the CW Guide, we familiarize you with some new miniature technologies, make sense of the new gadgetry and explain two techniques for linking remote users to the local-area network. You'll also want to read about the security and networking issues that arise. Finally, users rate top color notebooks and applaud the latest Apple PowerBook.

See stories pages 97-146.

Pacific Stock Exchange's David Eisenlohr is embarking on a 'virtual office' project

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In Depth: Re-engineering aftermath at Connecticut Mutual: IS Chief Jan Scites (left) said that at first people were afraid; for end user Kathleen Pogg, change has meant empowerment. *Page 149*

Executive Briefing

Some developers are getting lost in conflicting directions from Microsoft about how to develop for future versions of Windows. About three quarters are using the less-functional Win32s tool kit, which doesn't provide advanced Windows NT features. *Page 1*. Microsoft this week will preview a common macro language for its applications, but other commercial developers apparently won't have an easy way to use it in their products. *Page 1*. Its phone lines jammed, Microsoft pushes more of its support load onto hardware vendors. *Page 6*

Re-engineering processes and systems can be a gut-wrenching experience for IS and users alike. A look at projects taking place at Connecticut Mutual, Agway and Kodak reveals how re-engineering altered the lives and jobs of not only IS but managers and end users as well. *Page 149*

New software pricing options are giving users flexibility but also complexity. Diversity has spawned more paperwork and decision-making, and some users are less certain that they are getting the best deals. *Page 16*

Sun and Novell will connect their network management systems, using SunNet Manager to provide administrators with an overview of the network, while Novell NMS concentrates on specific NetWare issues. *Page 8*. Sun is also readying a salvo of help features aimed at the less SNMP-savvy users. *Page 1*

It's crunch time at Apple as Michael Spindler takes over as CEO. Analysts expect Spindler to cut R&D and lay off up to 2,000 employees. The next year should be rocky because innovative technologies like the Newton personal digital assistant and PowerPC Macintosh won't contribute revenue. *Pages 1, 20*

Mobile computing is prompting managers to learn new ways to communicate with far-flung employees. The CW Buyers' Guide offers purchasing tips for tiny technology. *Page 107*. Compaq garners high user-satisfaction ratings among top color notebook models, while Apple PowerBook users rave about that machine. *Pages 141, 145*

Performance trade-offs associated with Microsoft's ODBC database standard will push many developers into working with faster, existing proprietary interfaces for accessing SQL databases.

LAN servers

AS/400 retooled for NetWare service

By Craig Stedman
ROCHESTER, MINN.

■IBM is expected in September to add client/server functionality to its low-end Application System/400 computers in an attempt to position them more competitively as local-area network servers against Intel Corp. I486- and Pentium-based machines.

The rollout, which follows earlier IBM promises, is expected to include a move to make the central processors now used in the high-end 9406 models available as options on the lower end 9402 and 9404 series for use in file server applications.

IBM is also said to be planning to move some file processing functionality from the AS/400's CPU to its I/O processors to increase file uploading and downloading performance. In addition, streamlining is anticipated in the number of instructions in the OS/400 operating system related to moving files, according to David Andrews, managing partner at ADM Consulting in Cheshire, Conn.

Andrews said IBM may also make Novell, Inc.'s NetWare network operating system directly available on the AS/400 as part of the client/server strategy.

An IBM spokesman would not confirm or deny the reports, but he said it is "no secret that client/server is our direction" for the AS/400.

Steady but slow

While the AS/400 already functions as a solid database server, Andrews said, it currently is "significantly slower" at uploading and downloading files than 486-based systems equipped with NetWare. "It will do that job. It just won't do it very fast," he noted.

The moves IBM plans should make the AS/400 "a viable hybrid server which offers great performance" and lessens the need for users to put a separate 486 or Pentium box alongside it to handle file serving, Andrews said.

Rich Kolbe, director of MIS at Harley-Davidson, Inc. in Milwaukee, said he was pleased by the reports. "The idea of having something a little bit better to take advantage of PC networks, and of using the AS/400 as a file server in a more fluid manner, is something that appeals to me," he said.

Teresa Elms, president of the Elms Information Services Group consultancy in San Diego and an

AS/400 customer, said her surveys show one-third of all terminals attached to AS/400s are PCs. The reported plans "would be consistent with IBM's strategy," she said. "They finally got the religion."

But Andrews said he does not expect IBM to compete on price with 486-based servers. He is looking for the AS/400 to be positioned

A likely match

Nearly 60% of the AS/400 sites surveyed already have a version of Novell NetWare installed

BASE: 5,532

57%
3,162

Source: *Computerworld* Database Division, Framingham Mass.

as a higher end system that does both file and database serving while providing robust systems management.

Offering the higher end CPUs on the low-end AS/400s would likely make sense in PC LAN server applications where the work load would probably be high enough to keep the faster processors busy, Andrews said.

PCMCIA standard not in the bag
Competitive systems manufacturers holding up process

By Christopher Lindquist and Michael Fitzgerald
LOS ANGELES

While the Personal Computer Memory Card International Association (PCMCIA) appears to be marching inexorably toward a common, interoperable standard for PC cards, the group may encounter difficulties trying to keep its members from fracturing the standard.

If the PCMCIA cannot enforce its standards, PC cards will not become as interoperable as floppy disks, which will hurt their acceptance in the market.

The PCMCIA recently appeared headed toward delivering a solid, stable standard for all PCs as early as the end of this year [CW, May 31]. However, speakers on a PCMCIA panel at the Lap and Palmtop Show here said it is more likely that a consensus will not be reached until mid-1994.

The PCMCIA standard should also let users exchange cards among diverse systems, such as Intel Corp.-based notebooks and Apple Computer, Inc.'s Newton, but this may be years away from reality.

"Unfortunately, the marketplace is promoting these things as being generic," said Sam Walker, vice president of sales at Apex Data, Inc., a Dublin, Calif., maker of notebook peripherals. "We're far, far from that."
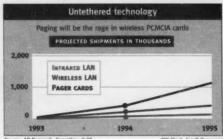
Striving to be unique

Walker said the problem lies with systems manufacturers that are trying to maintain some level of differentiation in a competitive market.

Most systems vendors, even in the Intel world, require card vendors such as Apex to write drivers specific to systems, although IBM and Grid Systems Corp. have systems that come bundled with PCMCIA socket services

specification 2.01, the latest version of the standard.

IBM sees this as enough of a problem that it introduced ThinkPad Proven, a program that certifies PC cards for use in its systems.

"The risk we're running into now is this stuff is going to start appearing in the stores, and there could be a consumer backlash," said Andrew Prophet, president of AP Research in Cupertino, Calif., a market research firm specializing in the PCMCIA and semiconductor

Untethered technology

Paging will be the rage in wireless PCMCIA cards

PROJECTED SHIPMENTS IN THOUSANDS

INFRARED LAN
WIRELESS LAN
PAGER CARDS

2,000
1,000
0
1993   1994   1995

Source: AP Research, Cupertino, Calif.   CW Chart: Janell Genovese

industries.

Various schemes are under consideration, including a means of marking cards and systems in such a way that users would be able to select working combinations, much as they can with automated teller machine cards today. Creating software drivers that would allow incompatible cards and systems to work together is another idea.

This will become more of an issue as non-Intel devices that could use PCMCIA — for example, personal digital assistants such as the Newton and the AT&T EO Personal Communicator — become more widespread. While all will be PCMCIA-compliant, cards for one system may not work in the PCMCIA slot of another, Prophet said.

Better mobile network infrastructure needed

By Michael Fitzgerald
and Joanie M. Wexler
DALLAS

Data communications issues remain major stumbling blocks for notebook users, according to attendees at Dataquest, Inc.'s Mobile Computing Forum here last week.

For example, during a conference session, Sheldon Laube, Price Waterhouse's national director of information technology, lambasted vendors for implementing a communications infrastructure — both wired and wireless — that shows a lack of foresight.

"Today's systems are aimed at short, fast transactions; they're not good for big files," Laube said.

Users need the same access to data on the road as they do from their desktops, Laube said, and with vendors talking about features such as voice annotation and video, the data infrastructure is not yet adequate.

However, several initiatives are un-

der way to address some of these issues. In the wireless world, for example, the next generation of cellular technology will convert today's analog cellular network, which can carry data at only about 2,400 bit/sec. because of its poor quality, to digital, said Paul Nikolich, a senior engineer at Racal-Datacom, Inc. and wireless standards committee member.

Digital cellular should boost individuals' wireless wide-area network access to 100K bit/sec. per user — speeds comparable to what users end up with on shared local-area networks.

Also, the Federal Communications Commission has approved a technology called CellularVision, patented by the company of the same name in Freehold, N.J. It can reportedly run videoconferencing, multimedia and other high-bandwidth applications at 1G bit/sec. speeds — potentially rivaling fiber optics [CW, Dec. 21, 1992].

In addition, vendors such as SimWare, Inc. offer compression software

and processing techniques for laptops to reduce the volume of data going out over WANs, said Charles Nahabedian, vice president of corporate development at wireless carrier RAM Mobile Data in Woodbridge, N.J.

Not holding their breath

Several users agreed with Laube's central points, and few said they were counting on wireless technology soon.

For instance, at Energy Industries, a division of Holt Co. in Corpus Christi, Texas, that services gas compressors, "there is no way we can outfit our field service technicians with notebooks under the current way of doing things," said David Stephens, Energy's information systems manager.

Vendors acknowledged the communications issues. "People have got to play with this stuff for a while," said William A. Frezza, director of marketing and business development at Ericsson GE Mobile Communications, Inc. in Paramus, N.J. "If we try to solve problems before we bring the technology to market, we don't know what the problems are."

Dataquest predicted that 2.2 million notebooks will sell this year, compared with 1.8 million in 1992.

Quarterdeck recalls software

Quarterdeck Office Systems, Inc. has recalled some 100,000 copies of Quarterdeck Expanded Memory Manager (QEMM) 7.0 to fix problems reported by early users. QEMM 7.01 will be available soon and should resolve complaints, particularly those involving interaction with **Microsoft Corp.**'s DoubleSpace disk compression, that were discovered after the product had already been sent to dealers.

Wireless speeds up

Advances in wireless networking debuted last week from **Motorola, Inc.** and **AT&T Paradyne.** Motorola's Flex High Speed Paging Protocol, to be used over radio-based paging networks, reportedly boosts transmission speed, data integrity and battery life while operating at 1,600, 3,200 and 6,400 bit/sec. AT&T Paradyne's Enhanced Throughput Cellular protocol is said to also address the throughput and reliability issues facing mobile computer users today in the cellular networking environment.

SEC scrutinizes Storage Tek

Storage Technology Corp. said it is being investigated by the Securities and Exchange Commission on possible charges of insider trading and/or violations of federal disclosure or reporting laws. The investigation follows a class action suit filed earlier this year by investors who claimed Storage Tek executives sold chunks of company stock just before the firm announced delays of its Iceberg disk array. Storage Tek said it intends to cooperate with the investigation.

IBM names strategy guru

IBM has named Bernard Puckett senior vice president of corporate strategy and development; he will report to Chief Executive Officer Louis Gerstner Jr. A 26-year IBMer, Puckett was most recently senior vice president of the Application Solutions line. Industry watchers differed over whether this was a plum meant to show the existing raft of IBM execs that there could still be career advancement within IBM or a signal of Gerstner's intent to reorganize some parts of IBM along customers' lines of business.

PC price war casualties mount

There were signs last week indicating that last year's price wars are continuing to exact a toll on the PC industry. While **Groupe Bull**, owner of **Zenith Data Systems**, bought a piece of **Packard Bell Electronics, Inc.**, **CompuAdd Computer Corp.** filed for bankruptcy. Bull bought a 20% stake in Packard Bell and said Packard Bell and Zenith Data will co-develop a line of PCs — expected to be low-cost machines — to round out Zenith Data's product line. Packard Bell will resell Zenith Data's low-end notebooks. CompuAdd, meanwhile, declared Chapter 11 bankruptcy.

Vendors promote Unix standard

A group of 33 vendors have joined to promote standard application programming interfaces for storing data under Unix. The Data Management Interfaces Group includes **IBM's** AdStar peripherals business, **Hitachi Computer Products, Inc.** in Santa Clara, Calif., **Auspex, Inc.** in Houston and E-Systems, Inc. in Dallas.

SHORT TAKES United Parcel Service, Inc. will build a $55 million data center in Atlanta to back up its primary facility in Mahwah, N.J. . . . **3Com Corp.** announced record sales of $167 million and record earnings per share of 40 cents for the quarter ended May 31.

ODBC drivers lack power

By Michael Vizard

Vendors such as Microsoft Corp. are talking up the importance of Open Database Connectivity (ODBC) drivers for linking front-end PC databases and applications to back-end SQL databases. But industry analysts are warning information systems directors that performance considerations are going to make ODBC interfaces a secondary choice for developing client/server applications.

ODBC, Microsoft's implementation of the SQL standard from the SQL Access Group, was designed to give developers a common SQL interface that can be applied to multiple back-end databases.

Earlier this month, Microsoft delivered Version 1.1 of its Access database, which includes ODBC drivers for accessing data stored on SQL databases from Microsoft, Oracle Corp. and Sybase, Inc. [CW, June 7].

But industry analysts stressed that the performance trade-offs associated with the current ODBC implementation will push most developers into working with faster, existing proprietary interfaces for accessing SQL databases.

"ODBC is a marketing initiative that's not going to perform well in production applications," asserted Richard Finkelstein, president of Performance Computing, Inc., a consulting firm in Chicago.

In fact, developers are already shying away from both ODBC and Borland International, Inc.'s Integrated Database Application Programming Interface initiative until they see how widely they are accepted, said Noah Ross, director of technology at Cap Gemini USA, a systems integrator in New York.

Finkelstein maintained that ODBC will never evolve into a real industry standard because it is a lowest common denominator interface, which limits functionality.

"Every time developers come up against a limitation, they use escape clauses in ODBC to access native drivers. The real industry standards are the Oracle and Sybase native interfaces," he said.

Finkelstein also noted that ODBC drivers do not support complicated database calls.

In defense

For its part, Microsoft takes exception to any suggestion that ODBC is a lowest common denominator interface.

"We're not telling people that there isn't any room for proprietary APIs, but there is no empirical data that says ODBC is any slower than any other interface," said Kyle Geiger, ODBC general manager at Microsoft.

In fact, developers at Xerox Corp. in Rochester, N.Y., are using ODBC to link Access to Oracle and IBM's DB2 database over Transmission Control Protocol/Internet Protocol.

That application, which currently consists mainly of one-way queries, runs exceptionally well, said Doug Long, a senior programming analyst at Xerox.

But as developers move to program more robust interactive applications, they may find native interfaces offer richer choices.

"A specific driver is going to be much faster than a standard driver. Our tests here show that ODBC is definitely much slower than the native drivers," concurred Swaroop Conjeevaram, manager of product marketing at Dharma Systems, Inc. in Nashua, N.H.

Open adoption

Projected percent of applications using open API

1993	1994	1995	1996	1997
3%	15%	40%	65%	80%

Source: Meta Group, Inc., Westport, Conn.

MS-DOS support plan raises user questions

By Michael Fitzgerald
and Christopher Lindquist

Users who buy software bundled on their hard drives may be in for a surprise the next time they call Microsoft Corp.: The company appears to be enforcing a 2-year-old policy that says it is responsible for supporting only its retail customers.

Last week, users said the policy, if continued, could spark an outcry.

Microsoft and various hardware vendors agree that if a box comes bundled with DOS, Windows or Microsoft applications preinstalled, the hardware vendor, not Microsoft, should handle support for it [CW, June 21]. Before Microsoft went retail with DOS 5.0, all DOS was sold with systems and was officially supported by OEMs.

"Let me stress that I have not experienced this, but if it was true, we would have to sit down with Microsoft," said Glenn Jurmann, section manager of office technology at Baxter Healthcare Corp. in Deerfield, Ill.

But Douglas Murphy, director of MIS at Comcast Corp., said he recently called Microsoft on

Microsoft receives 20,000 support calls a day worldwide. With electronic and other forms of support added in, that number jumps to 50,000.

a routine DOS 6.0 issue and was surprised when on three separate calls, "Microsoft told me that they won't support DOS 6.0 if it's preloaded by the manufacturer." He was referred to his manufacturer for support. Murphy's shop uses PCs from Compaq Computer Corp., Dell Computer Corp. and AST Research, Inc.

Microsoft winnowed Murphy out by asking for a serial number found on retail copies of its products. But this practice appears to be arbitrary. Jurmann said he has been asked for a serial number, but despite not having one, received support anyway.

Microsoft said its policy has always been to refer users of OEM versions of Microsoft software to the hardware vendor. However, the procedures were not always in place to make sure only retail customers were supported, which may be why a half-dozen users contacted said Microsoft has always supported them.

"In general, we have been consistent about enforcing" the policy, said Kathy Fiander, marketing manager in product support services at Microsoft. "Of course, in any given situation we try to be flexible to customer needs, such as when laptop users may be traveling and do not have their serial number with them."

Referring users to the manufacturers could become common. One well-placed source at a major hardware maker said Microsoft "has been telling us in the last few months that it plans to start cracking down on this."

Network management systems connect

SunConnect and Novell partnership to provide centralized administration

By Elisabeth Horwitt

In a highly complementary alliance, Sun Microsystems, Inc. subsidiary SunConnect and Novell, Inc. have agreed to interconnect their respective network management systems, SunNet Manager and NetWare Management System (NMS).

The idea is for SunNet Manager to provide central administrators with an overview of the enterprise network, leaving NMS users to concentrate on specific NetWare issues, Sun said.

The agreement puts Novell's huge NetWare installation within reach of SunNet Manager, which needs to strengthen its position in the local-area network client/server management

Network partners

The Sun/Novell agreement opens access to NetWare for SunNet Manager users

1.7M

1992 worldwide installed base

5,750

SunNet Manager | Novell NetWare

Source: International Data Corp., Framingham, Mass., and Burton Group, Salt Lake City

arena, according to Brad Hecht, a senior analyst at Gartner Group, Inc., a market research firm in Stamford, Conn.

Conversely, SunNet Manager is the dominant player in multivendor, Simple Network Management Protocol-based internetwork management, an area that Novell is only just beginning to enter.

Sun also brings to the party broad third-party network management application support, which is still comparatively limited for the newer NMS.

The NMS connection will address the needs of users who had been using SunNet Manager to manage "the big [Unix] boxes and routers and letting the PCs take care of themselves," said Sun spokesman Stan Bald-

win. "They said they wanted to see what those [PC] guys are doing to make it part of the overall networking plan."

The initial offering, due out in first-quarter 1994, will allow the two systems to share information for managing the NetWare environment. For example, NMS will allow SunNet Manager to access detailed information about NetWare servers, including print queues and print jobs, LAN subsystems, NetWare Loadable Modules, memory, CPU and disk use and software configurations.

Looking ahead

Future interoperability will include an autodiscovery tool that reportedly will allow a SunNet Manager administrator to map out and diagram topology information about NetWare servers and at-

tached devices.

"People tend to have Unix, Sun and Novell intertwined already" at corporate sites, Baldwin said.

He added, "SunNet Manager will provide a central view but also manage Novell servers pretty thoroughly" via NMS.

The agreement represents the first solid piece of Sun's next-generation network management architecture, which will define how multivendor network management systems can cooperatively manage enterprise network installations, Baldwin said.

Sun plans to enter similar partnerships with other network management vendors over time, in order to bring additional aspects of enterprise networking, such as telecommunications devices and services, under the SunNet Manager umbrella.

> Sun's next-generation network management architecture will define how multivendor network management systems can cooperatively manage enterprise network installations.

Sun boosts management

ment platforms, according to consulting firm Kaptronix, Inc. in Haworth, N.J. Last week Kaptronix published a report comparing SunNet Manager, NetView/6000 and OpenView, based on an in-house evaluation of the three products (see story this page).

Introduced in the late 1980s, SunNet Manager has long enjoyed a dominant market position as a development platform that third parties could use for their own network management systems. However, Sun has fallen far behind rivals HP and IBM when it comes to targeting user companies that are in the process of picking their enterprise network management system, analysts and users said.

IBM and HP have been aggressively fitting their products with graphics-based Help tools, applications and automatic utilities that screen users from the complexities of Simple Network Management Protocol (SNMP). These tools make it a lot easier to switch between the different applications and views needed to manage a network, according to Atul Kapoor, Kaptronix president.

Unloved interface

A lack of such features has made SunNet Manager awkward and frustrating to use, according to Kaptronix. Users agreed: "It has an ugly excuse of a human interface, very sparse, and the graphics are not all that useful," said John Scoggin, supervisor of network operations at Delmarva Power & Light Co. in Newark, Del., which bought a copy of the product to manage Sun workstations. "That's one reason we don't use it [more widely]. It's not the easiest thing to install, either."

"We use SunNet Manager because we've got a cheap site license [with a large Sun workstation installation], not because we're particularly fond of it," said Kevin Oberman, a network manager in the engineering department at University of California Lawrence Livermore National Laboratory

in Livermore, Calif. "It does a job reasonably well in an awkward manner."

The list price for SunNet Manager is $3,995, while Open-View Network Node Manager and NetView/6000 both cost approximately $15,500.

The enhancements coming out this summer will address "many of the ease-of-use features" that the Kaptronix report identifies as missing from SunNet Manager, Borcich said. The enhancements will not change SunNet Manager's price, he added.

Several users expressed a strong preference for Motif over SunNet Manager's current proprietary graphical user interface, OpenLook. Sun will deliver Motif support in the second half of next year, Borcich said.

Beyond the user-friendly features expected out this summer, Sun is preparing the next generation of SunNet Manager, a cooperative architecture in which "no single platform [from any one vendor] will do everything," Sun spokesman Stan Baldwin said.

Taking a partner

Sun made its first move in that direction last week with the announcement that it will partner with Novell, Inc. to develop interoperability across SunNet Manager and Novell's NetWare Management System (see story above).

The architecture will support industry application programming interfaces such as the X/Open Management Protocol and provide services for coordinating resource management and information exchange across different management domains, according to Sun.

This strategy, on the face of it, fits well with a network management architecture that Ontario Hydro has been developing prior to actually shopping for products, according to Simon Chan, a telecommunications engineer at the Toronto-based utility.

"Our criteria is openness and the ability to integrate not just vertically across multivendor element management systems but horizontally between management functions and domains," Chan said.

> "We use SunNet Manager because we've got a cheap site license, not because we're particularly fond of it."
>
> —*Kevin Oberman,*
> *Lawrence Livermore*
> *National Laboratory*

Is good Help hard to find?

In a comparison of the following end-user Help features, NetView/6000 provided the greatest functionality and ease of use in the following areas, with OpenView coming in second followed by SunNet Manager, according to Kaptronix.

• Software utilities that guide users through the process of installing the network management platform on a Unix system, screening them from the complexities of Unix, SNMP and Transmission Control Protocol/Internet Protocol.

• User-configurable icons that make it easier to track and quickly call up crucial applications or windows into a particular network installation or view.
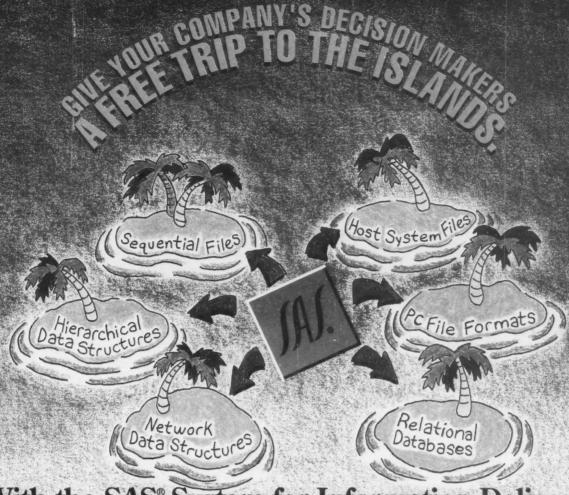
• Autodiscovery that automatically finds devices on the network and then plots their relationships on a topological map. SunNet Manager can "find" network boxes but does not plot the relationships, Kaptronix said.

• Ability to zoom down to greater and greater levels of detail about what is happening on the network.

All three products need work on:

• Documentation sufficient to help users set up network management applications, particularly complex ones.

• Understandable error messages. Current ones require in-depth understanding of how SNMP works.

• Determination of the probable cause of a problem once it is reported.

Win32 web

and security and symmetrical multiprocessing, that are included in the full Win32 kit.

But as Windows developers begin to master the basics of 32-bit programming, many of them are now looking at whether they should move beyond Win32s to the full Win32 kit or opt to program to a separate kit, referred to as Win32c.

This latter kit will allow applications to run on Microsoft's forthcoming Windows 4.0 operating system for Intel Corp. platforms, a 32-bit preemptive multitasking environment known as Chicago.

In contrast, the full Win32 kit allows applications to take full advantage of the features in both Intel and RISC platforms, the company said.

"People are looking toward Windows 4.0 and are becoming much braver in terms of working with the Win32 kits," said Noah Ross, director of technology at Cap Gemini USA, a New York systems integrator.

Stability needed

"Developers are climbing the walls trying to figure out what API to write to. Microsoft needs to stabilize the target platforms; otherwise, they are threatening these people's business," added John Donovan, an industry analyst at WorkGroup Technologies, Inc. in Nashua, N.H.

According to Microsoft, Win32c is the first step toward 32-bit computing that gives applications access to a flat memory model. And although the Chicago project is still evolving, most developers using Win32s on Intel platforms should look to Chicago as their growth path, said Brad Struss, manager of Win32 developer relations at Microsoft.

Meanwhile, Struss said developers working with the full Win32 kit on Intel and RISC systems should probably look to Microsoft's Cairo project, an object-oriented file system due in 1995, as their growth path.

For example, IMRS, Inc., which develops financial software, used the Win32 kit to develop its 32-bit applications, which will run on both Intel and RISC platforms without taking advantage of the multithreading capabilities of the RISC platforms.

Because IMRS will focus more on adding new features to its software during the next year, IMRS will probably move to support the features set in Win32c rather than write to the full Win32 application programming interface (API), according to Dave Morehead, director of research at Stamford, Conn.-based IMRS.

"Which kit you choose depends a lot on how much you want to take advantage of features like multithreading on platforms other than Intel. You just have to figure out how much extra performance multithreading gets you on some platforms and the importance of the security features. But it's about the same amount of work with either API," Morehead said.

Different targets

In general, Struss said the major differences between NT, which requires at least 16M bytes of memory, and Chicago, which is expected to require only 8M bytes of memory, is that the latter project is aimed solely at Intel platforms, while NT is a portable offering that has higher levels of security and multithreading capabilities.

In addition, NT will eventually have a higher level of peer-to-peer networking services as part of the migration to Cairo, he added [CW, May 31].

As a result, developers such as Lotus Development Corp. said they see Win32s as a kit targeted at client applications, while the full Win32 kit targets NT server- and RISC workstation-class applications.

"We see Chicago as being sort of an NT-lite that will fit on the desktop, while Cairo is kind of an NT-2," Morehead added.

And the time frame for when developers want to deploy those applications may ultimately decide which Win32 kit they choose.

"If you want to deploy it in 1993, you'll use Win32c. If it's 1994, you can use the full Win32 kit for NT; and if it's 1995, you can think about Chicago," said David Cearley, a vice president at Meta Group, Inc., a Stamford, Conn.-based consulting firm.

If you can do it on a PC... you can do it in COBOL.

Peer-to-peer networking

IBM releases APPN control

By Joanie M. Wexler
RESEARCH TRIANGLE PARK, N.C.

An abrupt passing of the gavel at an IBM developers' conference last week unshackled third parties from IBM's longstanding dictatorship over key networking technology.

The unexpected industry milestone — brought about by a third-party rebellion against IBM at its Advanced Peer-to-Peer Networking (APPN) Implementors Workshop here — had many developers grinning from ear to ear as they got peeks at new technology, received reasonable software licensing terms and welcomed a democratic change of pace.

IBM realized that if APPN — its emerging technology approach to distributed networking — is to hold its own against Transmission Control Protocol/Internet Protocol (TCP/IP) as a viable next-generation backbone, "it will have to open its doors to other vendors' input," said Terrence Bishop, vice president of marketing at Insession, Inc., a Boulder, Colo., builder of IBM Systems Network Architecture (SNA) software for Tandem Computers, Inc. systems.

The epiphany means users will eventually get technology no longer chained to IBM's development pace and view of the world, a situation that should result in an acceleration of interoperable products, developers said.

Attendees take action

Much of the conference flurry centered around the future of Data Link Switching (DLS), an IBM-generated scheme for routing SNA traffic by encapsulating it in IP packets. Conference attendees witnessed so much contention between IBM and router bigwig Cisco Systems, Inc., which touts its own encapsulation technique, that they reportedly got fed up and ousted both IBM and Cisco from leading the DLS development efforts.

Instead, they elected a "neutral" third-party consultant,

Louise Herndon Wells at the Internetwork Technology Institute, to chair a DLS Special Interest Group, a democratic first at an IBM developer's conference. Herndon Wells set up seven working groups focused on DLS issues such as congestion control and Ethernet interoperability.

The DLS committee agreed to work toward a common method for running SNA over IP "so different routers can communicate," said Alan K. Bartky, manager of technology at Sync Research, Inc. in Irvine, Calif. Bartky said he was concerned going into the "initially tension-ridden" meeting about whether his company's wide- to local-area network adaption devices would interoperate with IBM's 6611 router, but he said his worries were alleviated.

Common ground

Bartky also predicted that Advanced Peer-to-Peer Internetworking, Cisco's rival to APPN, and DLS will "eventually merge toward a common standard."

Other signs of APPN progress included the following:
• IBM opened up its APPN Network Node interoperability testing service to any vendor with an APPN implementation. Previously, only companies that licensed APPN Network Node source code from IBM (for $400,000) could earn IBM's interoperability seal of approval for their products.
• IBM agreed to license APPN End Node software, including the right to use all APPN patents, for a onetime $5,000 fee. "This is very fair and means nothing now stands in our way with end node development," said Miles Ulrich, SNA technology center manager at Wall Data, Inc., an SNA gateway maker in Redmond, Wash.
• IBM revealed snapshots of its High-Performance Routing and Discovery architectures, enhancements that add dynamic functions to APPN.
• A group met to foster progress for a technology that would enable a 3270 terminal to attach to an APPN network.

Cisco offers low-end links

By Joanie M. Wexler
MENLO PARK, CALIF.

Companies looking to blend ever-smaller sites into their corporate internetworks gained more options at palatable price points from router leader Cisco Systems, Inc. last week.

In a competitive response to 3Com Corp.'s Boundary Routing architecture — a low-cost, bridge-like technology announced last December that many companies are eyeing for their network peripheries (see story at right) — Cisco introduced an ultra low-end platform, called

Access for everyone

Users are seeking to push their internetworks out to smaller and smaller sites, but they need inexpensive routers to do it

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the Cisco 2000, with prices starting at $3,195.

Most low-end routers on the market today begin in the $5,000 price range.

Cisco also enhanced existing remote router models and added overarching administration and management tools, which include the ability to centrally install far-flung routers.

The rollouts look to be a "good fit for our small sites — and we have a lot — mainly because of cost," said Reuben Lantto, director of international telecommunications at Cargill, Inc., a Cisco shop in Minneapolis.

"The centralized installation will be very useful when deploying a big network and you're short on people and time," he said.

Protocols run

The Cisco 2000 fixed-configuration router runs a limited protocol set: Internet Protocol, Novell, Inc. IPX, Apple Computer, Inc. AppleTalk, X.25, bridging, frame relay and bandwidth-conserving dial-on-demand capabilities.

The wide-area links, plus a basic-rate Integrated Services Digital Network interface added to the larger Cisco 3000, aim to let users choose the lowest cost telecommunications service in a given part of the world, said David Gudmundson, Cisco product manager.

"The cheaper the routers are, the less we have to charge for our services," said the telecommunications manager at a Canadian government agency that provides network services to nonprofit public organizations.

British Columbia Systems Corp. runs about 200 Cisco routers, said Al Teasdale. He said taxpayers pay for network services to hospitals, schools and government ministries. "We're pushing Cisco for something under $1,000."

"There's clearly a lot of interest in the super-low end," said Fred McClimans, an analyst at Gartner Group, Inc. in Stamford, Conn. "And Cisco has decided the market is ripe for another price cut and has changed the rules."

McClimans predicted that with low-end routers priced just a few hundred dollars more than bridges, users will opt for routing to gain bandwidth management capabilities.

Cisco's reply
• **Cisco 2000** platform: $3,195 model with one Ethernet and one serial port; $4,195 model with one Token Ring and one serial port.
• **Cisco 3000** models: $5,795 version with one Ethernet, two serial and one ISDN port; $6,995 Token Ring version.
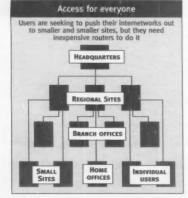
Bandwidth management, please

The invisible hand of competition may be casting a Hatfield-and-McCoy-like aura around Cisco and 3Com. But in the true spirit of capitalism, users will benefit.
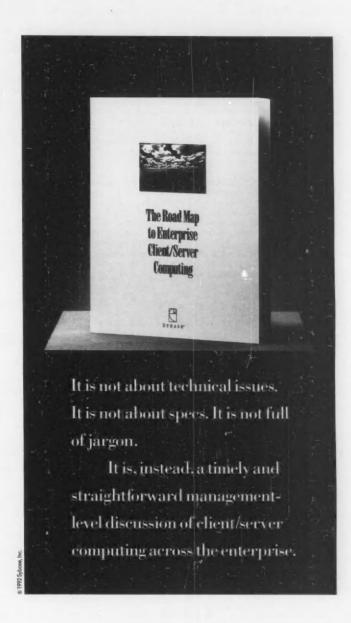
3Com said last week it will seek to reduce users' cost of WAN ownership by 50% by enhancing its router line this year with more bandwidth management capabilities and additional Boundary Router wide-area network interfaces. Boundary Routing is a low-end 3Com router architecture that simplifies and reduces the cost of remote routing where a given site connects to just one other site.

Janet L. Hyland, director of network strategy research at Forrester Research, Inc. in Cambridge, Mass., said that in contrast, Cisco's announcement "is their answer to Boundary Routing — and it's not a very creative one."

She said users would have benefited by more bandwidth management capabilities, akin to 3Com's enhancements, in Cisco's first releases. —*Joanie M. Wexler*

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Show spotlights emerging wares

Sights to include WordPerfect's Amber, HP's Vectra VL, Lotus' Improv

By Michael Vizard and Michael Fitzgerald

This week's PC Expo will offer attendees a walking tour of bleeding-edge technologies.

WordPerfect Corp., for example, will showcase WordPerfect applications working on top of the Amber technology that is being developed by **Apple Computer, Inc.** and **Novell, Inc.** Amber is a set of facilities similar to Microsoft Corp.'s Object Linking and Embedding protocol for Windows that was designed to link applications across Macintosh, Novell NetWare and Unix environments. In addition, **Borland International, Inc.** will demonstrate development tools that work across the Amber architecture.

Meanwhile, **Hewlett-Packard Co.** will announce its entry into the low-end PC market with the Vectra VL line. The line features three basic models, built around Intel Corp. 25-MHz I486SX, 33-MHz 486DX or 33/66-MHz DX2 processors, and will start at less than $1,250.

The day when you have an interactive conversation with your PC may come sooner than you think. IBM will demonstrate prototypes of the WordPerfect word processing software and Lotus Development Corp.'s 1-2-3 spreadsheet running on OS/2 equipped with speech-recognition software. IBM will also ship speech-recognition developer kits for Windows in 30 days, according to Elton Sherwin, IBM manager of speech recognition.

PC Expo attendees will also witness the first point release of **Lotus'** Improv spreadsheet, which thus far has 200,000 licenses delivered. Release 2.1 includes support for the WK4 file format found in 1-2-3 Version 4.0, a database access driver from Pioneer Software, Inc., support for the Application Field Exchange that will link Improv to the Notes groupware offering and a network-ready installation procedure. Improv is available for $199 to anyone who already has spreadsheet packages.

Users looking for a way to upgrade their 386 systems to 486 systems without replacing the motherboard will likely be glad to see **Cyrix Corp.**'s CX48DR^2 chip upgrade. The chip lets users with 16-, 20- or 25-MHz 386DX systems upgrade to 486-class power by just replacing a chip. Cyrix will make a clock-doubled version of each speed, priced at $349, $399 and $499. The 16/32-MHz and 20/40-MHz chips are available now, while the 25/50 will ship in September.

In addition, the pen may prove mightier than the keyboard after all. **Inforite Corp.** in San Mateo, Calif., plans to launch pen-based technology that will allow its MP 100 Writing Pad to interface with off-the-shelf Windows and DOS applications.

Toshiba America Information Systems, Inc. continues to buck portable trends. It is expected this week to release its T6600C luggables, which are larger and weigh more than their predecessors. Still, the trade-off could be worth it for users because the systems include room for two expansion slots and have a 510M-byte hard drive, a 10.4-in. color screen, a built-in 5¼-in. double-speed CD-ROM drive and a MediaShare Mambo digital video interactive card. Pricing ranges from $7,699 to $9,499 for the three models, which range from 17.1 to 19.3 pounds.

IS to gain application control

ros, or agents, that can be deployed across multiple Microsoft applications running on Windows and Macintosh desktops.

Also, the common macro language, which will be included in forthcoming Microsoft applications, will make it easier for corporate developers to integrate custom applications built using Visual Basic with shrink-wrapped Microsoft packages.

"We need to incorporate Word and Excel into our applications, which today requires low-level programming," said Bob Remmington, project leader for the computer human interface for the rapid prototyping laboratory at Lockheed Missiles & Space Co. in Sunnyvale, Calif.

The Visual Basic offshoot is based on technology created under Microsoft's Object Basic project. The latter technology will form the foundation of future iterations of the Visual Basic language for 32-bit platforms, according to Robert Bach, group product manager for Microsoft's Office.

However, only the next major releases of Excel and Project will support the common macro language. Other Microsoft applications such as Word will add support for the common macro language in future releases. Meantime, Bach said the common macro language will be able to call Excel-, Word- and other application-specific macros as subroutines embedded in a Visual Basic macro.

Microsoft is expected to use this technology to create a series of templates for automating specific tasks.

One of those tasks will be a budgeting template that will collect and consolidate data from a variety of spreadsheets, according to Matt Cain, program director for desktop computing strategies at Meta Group, Inc. in Westport, Conn.

But while Microsoft is likely to win kudos from IS shops for better integrating its applications, independent software vendors are somewhat miffed that Microsoft does not plan to offer this technology to them for inclusion with their software.

Visual Basic's "Applications Edition has been optimized to work with our applications. It is unique to our applications," Bach said.

As a result, third-party applications will have to rely on OLE to integrate their applications with Microsoft applica-

> The common macro language will be able to call application-specific macros as subroutines embedded in a Visual Basic macro.

tions.

"So long as you expose your applications as an OLE container, you'll be able to work with Visual Basic or any other macro language," said Alex Morrow, vice president of cross-architecture platforms at Lotus Development Corp. (see story page 15).

But some developers said they were led to believe that Microsoft planned to develop a common macro language for all applications and are grousing that Microsoft has decided to leverage its Windows work into a competitive advantage.

"The people who can benefit from an open standard are small [independent software vendors] that could use Visual Basic to make their objects more intelligent," said Brent Williams, program di-

rector for PC software at International Data Corp. in Framingham, Mass.

"We knew that Microsoft wasn't going to publish an API for Visual Basic, but that's because we asked them. They weren't trying to hide it, but they weren't screaming it from the rooftops either," said Dave Morehead, director of research at IMRS, Inc., a Stamford, Conn., developer of financial software.

But it will still be a number of years before this lack of support for third-party applications becomes a problem, Williams said. Most sites will continue to work with their existing macro languages, with the transition to Microsoft's common macro language taking place during the next two years.

"We don't really have a need to integrate applications other than Microsoft's with our applications at this time. But I can see how it might be a problem in the future," Remmington added.

Microsoft's common macro language *can build macros that can be deployed across multiple applications*

IBM to unwrap PC-DOS 6.1, Pen for OS/2 software

By Christopher Lindquist
NEW YORK

IBM is set to announce its version of DOS 6.0 as well as several multimedia tools and a pen addition for OS/2 this week at PC Expo.

PC-DOS 6.1 will come complete with what IBM calls "full-function" utilities, compared with those found in Microsoft Corp.'s MS-DOS 6.0. IBM's additions include an antivirus package, a complete backup package that supports both tape and disk drives, Central Point Software, Inc.'s RAMBoost memory optimizer and an editor that supports multiple files.

While the latest version of PC-DOS was originally slated to contain data compression, Walter Casey, director of marketing, said IBM has decided to perform more testing before releasing a version of PC-DOS with AddStor, Inc.'s SuperStor compression package later this summer. Purchasers of the current release of PC-DOS will find a coupon in the box offering them a free upgrade.

PCMCIA support

The new PC-DOS will also directly support Personal Computer Memory Card International Association 2.0 and have elementary pen functionality that will al-

low purchasers to use a pen-input device, much as they do a mouse.

PC-DOS 6.1 will be available bundled on some hardware as well as in a retail package for purchase by end users.

OS/2 will also get some pen support. Pen for OS/2 will be available as an add-on for OS/2 2.1 and will include handwriting recognition and a development envi-

ronment for pen applications.

IBM will also unveil several "Ultimedia" multimedia products for OS/2, including Ultimedia Builder, a multimedia presentation development tool; Ultimedia Perfect Image, an image-editing package; and Ultimedia WorkPlace, which provides a means of adding extensions to images to allow sorting and

searching in a database.

All three products are due next month at a list price of $345 each for Builder and WorkPlace and $175 for Perfect Image. As a promotional offer, Builder and Perfect Image will be bundled for $99, or WorkPlace alone will sell for $99.

Pricing for PC-DOS 6.1 and Pen for OS/2 was not available at press time.

Alternative styles

While Microsoft is pushing Visual Basic as its common macro language, both Lotus and Borland International, Inc. are pursuing alternative strategies.

Lotus is in the process of adding LotusScript, a derivative of the Basic language optimized to its applications. Unlike Microsoft's effort, however, Lotus intends to enable LotusScript macros to be invoked by Lotus applications running across Windows, Unix, DOS and Macintosh platforms, according to Alex Morrow, Lotus' vice president of cross-platform architecture. The first iteration of LotusScript is in Lotus' Improv for Windows spreadsheet.

Meanwhile, Borland said a common macro language defeats the purpose of optimizing certain tools for specific applications. Instead, Borland plans to increase the level of interaction between its tools under the Borland Object Component Architecture.

Both companies said a key component of their integration strategies with other vendors is to make their applications comply with Microsoft's OLE Version 2.0.

—Michael Vizard

Novell development framework to debut

Novell, Inc. is expected today to lay out the details for AppWare, an object-oriented application development environment that will run on top of NetWare. The architecture is expected to incorporate technology from **Hyperdesk Corp.**, **Software Transformation, Inc.** and **Serius Corp.** — three recent Novell acquisitions that specialize in cross-platform application development tools [CW, June 14]. The aim, according to industry sources, is to make it simpler to develop applications that make use of NetWare services in an enterprisewide environment.

Traders sign up for network

A dozen Wall Street brokerage firms, including **Merrill Lynch & Co.**, **Salomon Brothers, Inc.** and **Morgan Stanley Group, Inc.**, have agreed to link to the Intermarket Trading Network. The new network, developed by **Merrin Financial, Inc.**, was designed to allow brokerage firms and money managers to execute trades and update all clearing and trade processing systems simultaneously.

United wary of interference

United Airlines last week became the latest carrier to limit use of personal electronic devices — including PCs — during takeoffs and landings. United Airlines said its policy, which goes into effect Thursday, is a precautionary measure designed "to address the possibility of such devices causing electromagnetic interference with cockpit navigation or communications systems."

Multimedia for the masses

Kaleida Labs, Inc. made a splash at last week's Digital World trade show with the long-awaited unveiling of ScriptX, a developer's tool for crafting a single multimedia title that can work on devices ranging from desktop computers to consumer electronics products. The Mountain View, Calif.-based company also introduced a new developer's program to encourage the creation of ScriptX products.

CSC division suspended from fed bids

Computer Sciences Corp. (CSC), a systems integrator in El Segundo, Calif., said its Applied Technology Division was temporarily suspended from bidding on federal contracts because of an outsourcing contract dispute with the **Environmental Protection Agency** (EPA). Last year, auditors probed allegations that CSC overbilled the EPA under a $347 million contract awarded in 1990. The suspension does not affect other CSC business units.

Net management standard touted

The **Distributed Support Information Standards Group** last week announced the availability of an initial specification for defining systems management information, including configurations, faults and performance.

SHORT TAKES Bell Communications Research has announced the successful trial of a multigigabit/sec. research network linking four states and several laboratories and universities.... H. Michael Morand, former vice president of marketing at **AST Research, Inc.**, was named president of **Leading Edge Products, Inc.** He replaces Al Agby, who left earlier this year over a pay dispute.... **NationsBank** in Charlotte, N.C., has signed a $2.3 million disaster recovery agreement with **CSC**.... **System Software Associates, Inc.** is developing an object-based version of its suite of applications software to run on IBM and **Hewlett-Packard Co.** Unix systems.

Price options swamp users

At the contracting stage, however, talk is outpacing any action

By Nell Margolis
and Johanna Ambrosio

Users who begged their software vendors for greater pricing flexibility and got it are finding out that having a basketful of options is no picnic.

Although suppliers, including IBM, Legent Corp. and Computer Associates International, Inc., have caved in to users' demands for more pricing options and contractual terms [CW, May 24], this diversity has spawned confusion.

Users are swamped by more licensing-related paperwork and decision-making than ever before. Many said they are besieged with too many potential players, platforms and pricing alternatives to be sure they are making the best deals or even understand the deals they are making.

How time-consuming is it? "A third of the paperwork going through my desk right now [relates to] contractual issues," said John Stevenson, vice president of MIS at Dallas-based Dr Pepper Co./The Seven-Up Co.

And if a sudden barrage of pricing models — such as user-based, usage-based, client-based, enterprisewide and a raft of combinations — are rolling out at too hectic a pace, a widely acknowledged new spirit of fairness and quest for clarity in the contracting process is still at the stage where talk outpaces action, according to many industry observers.

These issues were brought to light at last week's Information Technology Association of America-sponsored electronic town meeting on software licensing and subsequent *Computerworld* interviews.

The new software pricing diversity "has put on us a burden of analysis," noted Robert Rubin, vice president of information services at Philadelphia-based Elf Atochem North America, Inc. Nor are all the announced options even available, he added. "The new mechanisms some vendors are touting have not gotten down to the field reps."

State of confusion

Companies transitioning from host-oriented to distributed computing are also confused by the mind-boggling array of licensing options. Buffalo, N.Y.-based American Steamship Co. is in the market for help desk and inventory tracking management software to run on its PC local-area network. Business systems and telecommunications manager Jim Guarino said he likes the product he is looking at, but licensing it is proving an embarrassment of riches.

"I had to call the vendor and go through the price sheet line by line so they could explain to me what I need now and what later," Guarino said. "They have six different categories of how to price this stuff out. One was 'unlimited user environment.' Another was '250-user environment or clients,' but they

Elf Atochem's Robert Rubin: *Software pricing has his company feeling 'burden of analysis'*

don't mean the actual users on the system." Part of the 20-minute phone call was spent nailing down the vendor's definition of "client" and "user," he said.

Some aspects of the contracting process are distinctly improving, said Barry D. Weiss, a partner in the Chicago-based law firm Gordon & Glickson. Inspired by IBM's efforts to boil its software licensing contracts down to plain English, Weiss said, "A number of our vendor clients are rewriting their software contracts to make them easier to read, to enable businessmen to tailor them without a team of lawyers." On the other hand, he said he sees vendors soliciting lawyers' input on the front end of the contracting process, harnessing legal means to productive ends such as creating "contracting users' manuals."

Contracts are not just getting clearer — they are getting shorter: Legent said Executive Vice President Bill Drummey keeps its contracts to a single page.

Better attitude

And parties on all sides reported a clear change in the attitude users and vendors alike are bringing into contract negotiations these days. "Clients realize that we've been creative in our approach to their pricing requests, and they appreciate it," said CA Executive Vice President Arnold Mazur.

But few are ready to decree the licensing issue as out of the woods.

"I'm still skeptical about many of the agreements when you sit down and parse them out," said Harry Glasspiegel, a partner in the Washington, D.C., law firm Shaw, Pittman, Potts & Trowbridge. "Do they really protect the user? I've seen some vendors drafting more user-friendly contracts, but they're in the minority. Software contracting is still a 'caveat emptor' situation."

Spindler

not an aberration; it's the shape of things to come," said Doug Kass, a principal analyst at The Viewpoint Group, a research firm in Santa Cruz, Calif. "I think we're going to see a top-to-bottom overhaul on both management and product levels."

Some of the expensive R&D projects Sculley had forged as chief technologist — and pumped hundreds of millions of dollars into along the way — could come under the ax. "Apple has many, many people working on projects that ain't coming to market in anyone's lifetime, and they're going to bail out," said Al Canton, a high-technology consultant and Apple specialist in Fair Oaks, Calif.

Some users said they fear that Apple's many technological initiatives may have diluted the strength of its move to provide

Shaking the tree

Apple's growing research and development expenditures . . .

	APPLE	COMPAQ	DELL
'90	$478M	$186M	$17M
'91	$583M	$197M	$22M
'92	$602M	$173M	$33M
'93	$326M (First half of FY '93)	$38M (First quarter of FY '93)	$42M

. . . have not helped its flattening PC market share

'91	8.3%	3.3%	1.0%
'92	8.6%	5.0%	2.2%
'93	8.5%	6.7%	3.6%

PERCENT OF WORLDWIDE SHIPMENTS

Source: Company reports; InfoCorp, Santa Clara, Calif.   CW Chart: Nancy Kowal

wares for the corporate environment.

"Apple is going in too many directions at once without focusing on the business needs of today," said Eric Joa, manager of information systems at BC Hydro in Burnaby, British Columbia.

In the face of anticipated R&D cuts, Apple is expected to continue teaming with other companies to expand its technology base (see story above right). Users said such cross-platform teamwork is crucial.

"These kinds of partnerships carry a lot of clout because they legitimize Apple in the eyes of a lot of IS folks," said Robert Anderson, a senior analyst at A. O. Smith

Automotive Products Co. in Milwaukee.

Analysts' predictions for what stays and what goes as Spindler takes command include the following:

▶**PowerPC-based Macintosh:** Full steam ahead. Motorola, Inc. delivered the first chip earlier this year, and plans are still firmly in place to deliver a PowerPC-based Macintosh PC and server in the first quarter of 1994.

"Moving to the PowerPC and keeping users interested along the way is absolutely the most critical battle for Apple to win," said Jean-Louis Gassee, former head of Apple Products Division.

▶**Lots of new Macintoshes:** Good-bye. Users complain that Apple delivers too many models too fast without making clear what distinguishes one from the other.

"They're confusing the hell out of everybody," said Mike Bailey, a systems integrator at Lockheed Missiles and Space Co. in Sunnyvale, Calif. "They need to have fewer well-rounded products instead of dozens of machines aimed at specific niche markets."

Sharp pruning could quickly add to the bottom line. "It's time to go pluck, pluck, pluck and snip, snip, snip and make the company more profitable in the process," Gassee said. Early targets: the Macintosh IIVX (which competes with the more popular Centris line) and the PowerBook 165C (a color model that uses the less advanced passive-matrix screen).

▶**Newton:** Still a definite, but it has experienced early rough spots. Initially scheduled for a June release, an early prototype reportedly had trouble in some groups. "Apple already had software burned into ROM and was ready to roll it out, but it was disastrous," said one source familiar with Apple's plans.

Apple's Michael Spindler *will likely pare down costly R&D projects*

▶**Unix initiatives:** Up for grabs. Morris Taradalsky, Enterprise Systems Division general manager, recently said Apple is cooperating with IBM, Sun Microsystems, Inc., Hewlett-Packard Co. and Unix System Laboratories, Inc. to put the Macintosh user interface on machines running Unix. Some said this could blow up in Apple's face.

"Why pay for a Macintosh when you can get a much cheaper Unix box with a Mac interface?" asked Tim Harmon, program director for desktop computing strategies at Meta Group, Inc., a consultancy in Westport, Conn.

▶**Voice recognition:** Uncertain. Apple's voice-recognition technology, code-named Casper, is still a laboratory curiosity and might fall under Spindler's ax.

▶**Cross-platform technology:** A high priority. At a recent developer's conference, Senior Vice President David Nagel announced, "No major technology will be introduced from Apple that won't have cross-platform, near-simultaneous release."

His words met with ringing applause from the 3,000 developers in attendance and are a clear sign to Macintosh users that Apple is teaming up with the right people.

Some of the longer term and more consumer-oriented projects of Apple's Personal Interactive Electronics Division could take the hardest hit in the next year. Insiders said that while Apple remains emotionally committed to exploring new technologies, the here-and-now demands of running a profitable company mandate the reshuffling of priorities.

Senior writer Michael Fitzgerald contributed to this report.

AT&T reaches out to Apple

Speculation abounds that Apple will team with telecommunications giant AT&T to pool mobile computing and wireless networking expertise.

Some observers said they see synergy between Apple's laptop clout and efforts with its Newton personal digital assistant and certain AT&T business interests. These include its pending 33% interest in McCaw Cellular Communications and 51% ownership of EO, Inc.

While EO directly competes with the still unshipped Newton, "it wouldn't be hard to merge the two directions," said Danny Briere, president of TeleChoice, Inc., a telecommunications consultancy in Verona, N.J.

"Look for a telecommunications link between Apple and AT&T," such as running Newton transmissions over the AT&T Easy-Link messaging network, a source at AT&T said.

That fits in with AT&T's strategy to basically link its customers to the world via EasyLink, which is also gaining wireless connections.

— Joanie M. Wexler and Michael Fitzgerald

A matter of time

Did John Sculley jump, or was he pushed?

That was the question around watercoolers from Cupertino to Wall Street last week as Sculley handed over the CEO reins to his handpicked successor, Michael Spindler.

Most analysts agreed that rumblings about the transition had been heard for some time, and Sculley had not been actively involved in Apple's day-to-day operations for more than a year.

The final decision reportedly came in a board meeting two weeks ago, soon after Sculley warned Wall Street that Apple's earnings would be down sharply in the second quarter and hinted at price cuts and layoffs [CW, June 14]. One Apple insider said that at one point, Sculley was asked to leave the room. When he returned, he had been voted out as CEO. "Sculley was really ready to go, and the board gave him a nudge in the right direction," said Amy Wohl, president of Wohl Associates in Bala Cynwyd, Pa. — *James Daly*

Betwixt and between

B lame it on timing. Or, more specifically, a lack of it.

Innovative technologies such as Apple's delayed personal digital assistant, Newton, and the reduced instruction set computing-based PowerPC Macintosh are on the horizon, but they will not be available for months or contribute financially for a year or more.
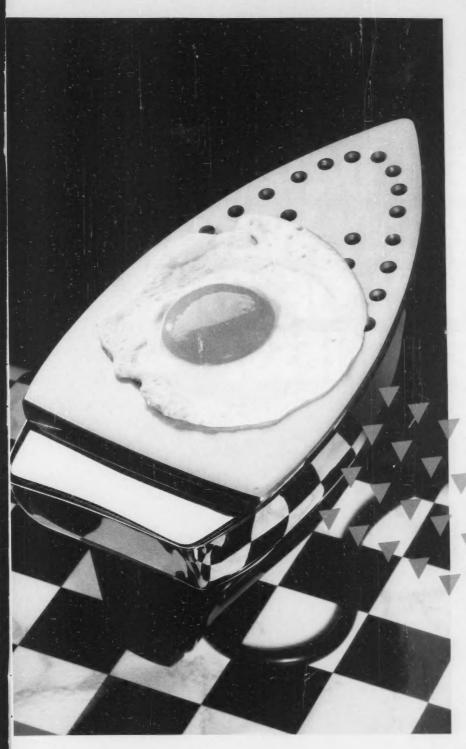
Additionally, Taligent — the Apple/IBM joint venture that is building an object-oriented operating system — will not deliver goods for at least another 18 months.

While users tap their toes, Apple must eke what is left out of the life cycle of the 9-year-old Macintosh. So far, it has only promised that certain high-end models will be upgradable to the new PowerPC chip, which will be used in Apple PCs due early next year.

Meanwhile, pressure from low-cost PC clones and Windows PCs has forced Apple officials to get out their red markers and cut Macintosh prices at least three times this year so far. This month's cuts shaved as much as 12% off the price of some models.

The price cuts are having an impact; Sculley said recently that sales on Macintoshes are already up more than 30% over last year.

Apple is not strapped for cash: It still has more than $1 billion in the bank. But more housecleaning is anticipated, including price cuts, the simplification of its product line and even layoffs. "Apple is like a person who goes on a yo-yo diet," said Jean-Louis Gassee, former head of the Apple Products Division. "One year it's fat, the next it's thin. That seems to be the way things always are." — *James Daly*

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IBM unwraps full-duplex Ethernet

By Lynda Radosevich

Continuing to expand beyond its traditional role as a provider of Token Ring products, IBM last week introduced the first "full-duplex" Ethernet adapter along with other new Ethernet, Token Ring and Fiber Distributed Data Interface (FDDI) local-area network products.

Full-duplex Ethernet is a fledgling technology that effectively doubles Ethernet's 10M bit/sec. transmission rate by allowing users to send and receive signals at the same time [CW, May 24]. IBM's full-duplex card is called EtherStreamer, and it can work at full- or half-duplex, allowing 10M or 20M bit/sec. transmission speeds. An autosensing feature can also automatically configure the adapter for 10Base-T, 10Base-2 and 10Base-5 cabling types.

To get the full benefits of the new technology, users will need a switching hub, which IBM has no immediate plans to offer. However, one was announced last month by LAN switch vendor Kalpana, Inc.

IBM's expansion into Ethernet and FDDI is aimed in part at customers who are looking beyond Token Ring products for future LAN installations, observers said.

For instance, Brad Baldwin, a program director at Gartner Group, Inc., said many of his IBM Token Ring clients ask about Ethernet because emerging fast networking technologies focus on Ethernet and because Token Ring adapters continue to cost two to three times more than their Ethernet counterparts for comparable products.

However, in IBM Token Ring shops such as Enron Corp. in Houston, IBM may have trouble breaking into new technologies.

While Enron does not plan to install Ethernet LANs, the company does buy FDDI adapters from Networth, Inc. in Irving, Texas, for its high-end servers and routers, which are connected by an FDDI backbone.

"We may evaluate IBM's FDDI cards, but we aren't in any rush to switch vendors," said Jim Queen, director of enterprise networking at Enron.

Overall, an IBM spokesman said that being first to market with a full-duplex Ethernet adapter shows the revamped company "can turn down the screws and turn out the technology quickly," an approach that IBM will continue to take with its Token Ring products as well, he said.

Network links keep growing:
- According to International Data Corp., **total shipments** of LAN adapters grew 36% between 1991 and 1992, from 9.2 million to 12.5 million units.

- The number of **installed LAN adapters** grew 39%, from 28.2 million in 1991 to 39.2 million in 1992.

- **Worldwide revenue** increased from $2.5 billion in 1991 to $3 billion in 1992.

Fast connections

IBM's new LAN adapters, hubs and bridges span a range of price and performance

PRODUCT	PRICE	AVAILABILITY
LanStreamer 16-bit MCA Token Ring adapter	$645	Now
Six-port Ethernet hub	$345	July 30
Full-duplex Ethernet adapter for 32-bit MCA-based computers	$595	July 30
FDDI adapters	$700 to $1,700	July 30
LanStreamer Token Ring bridge	$1,995	July 30
Updated AIX intelligent hubs	$4,500 to $8,400	July 30

A Salute to the Winners

The 1993 Information Technology Leadership Awards

Established in 1990 to enhance the Computerworld Smithsonian Awards, Leadership Awards recognize individuals whose vision and values have set positive examples. Recipients are individuals or teams who have demonstrated outstanding dedication, courage and cooperative spirit.

Sponsors of Leadership Awards select their own nominating committees, typically enlisting the expertise of colleagues, customers, influential business associates and policy makers. Nominating committees have a balanced mix of perspectives, with representatives from corporate America, technology, and academic and public policy bodies.

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The MCI Information Technology Leadership Award for Innovation

Dr. Gordon Moore
Chairman of the Board, Intel Corporation

The COMPUTERWORLD SMITHSONIAN Information Technology Leadership Award in Education

Sharon McCoy Bell
Director, Information Technology Center, New Orleans Public Schools

The SCIENCE APPLICATIONS INTERNATIONAL CORPORATION Information Technology Leadership Award for Global Integration

R. E. Turner
Chairman of the Board & President Turner Broadcasting System, Inc.

The CRAY RESEARCH Information Technology Leadership Award for Breakthrough Computational Science - Co-recipient -

Dr. Robert Chervin
National Center for Atmospheric Research

The CRAY RESEARCH Information Technology Leadership Award for Breakthrough Computational Science - Co-recipient -

Dr. Albert Semtner
Naval Post Graduate School

THE COMPUTERWORLD SMITHSONIAN AWARDS

THE FRE

INFORMA

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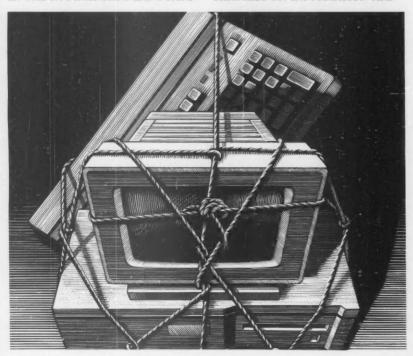
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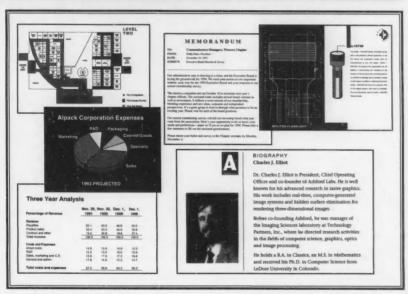
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HDTV proposal

The much-ballyhooed age of high-definition television (HDTV) edged a bit closer last month, thanks to an agreement to merge competing HDTV transmission proposals. Negotiated on and off for the past two years, the so-called "grand alliance" proposal will present the Federal Communications Commission's Advisory Committee on Advanced Television Service (formed in 1987) with a single plan.

The consolidated proposal will contain the best elements of the four systems developed by three groups: Zenith Electronics Corp. and AT&T; General Instruments Corp. and MIT; and a consortium led by Europe's Thomson Consumer Electronics and North American Philips, along with the David Sarnoff Research Center.

Xerox displays

Scientists at Xerox Corp.'s Palo Alto Research Center announced last month the development of color and black-and-white flat-panel displays with resolutions of 1.6 million pixels. Xerox's displays, shown for the first time at last month's Society for Information Display conference in Seattle, are reportedly the highest pixel-count active-matrix LCDs ever developed. The 13-in. monochrome screen, with 3,072- by 2,048-pixel resolution, offers approximately 20 times the pixel count of 13-in. monochrome Video Graphics Array desktop displays. The color screen offers 1,536- by 1,024-pixel resolution.

Cable Prodigy?

Prodigy Services Co., operator of the Prodigy on-line service, became the latest player to toss its hat into the on-line multimedia arena. Earlier this month, the White Plains, N.Y., videotext firm said it planned to open its network infrastructure to third parties such as cable operators and producers of interactive cable TV programs and services. Prodigy is also developing its own interactive TV services. Prodigy recently demonstrated a prototype of this integrated TV/videotext service.

On-line at the bus stop

Prototype system will give passengers access to fares, schedules

By Elizabeth Heichler

Waiting for a public bus may never be the same if a prototype vehicle-tracking system slated for testing outside of London gains widespread acceptance.

Next summer, bus passengers in Birmingham, England, will know exactly when the next bus is due to pull up to their stop when a new microcomputer-based route and schedule system hits the streets.

The system will use navigational satellites to continually track the position of individual vehicles, allowing it to calculate and display on terminals at each stop the arrival times and route numbers of the next three buses.

Besides gaining the convenience of knowing when the next bus is due, passengers will also be able to query on-street terminals about

Heichler is a European correspondent at the IDG News Service.

the best route to a particular destination, as well as display associated fare and timetable information.

For the pilot system, scheduled to begin operation in the summer of 1994, 50 buses on two routes running to the center of Birmingham will be outfitted with equipment to receive positioning signals from the navigational satellites that make up the international Global Positioning System.

Bus station and ticket offices will be supplied with Intel Corp. I486-based PCs running Windows; these remote locations will be connected to the ICL computer over Integrated Services Digital Network lines.

The bus stops will be equipped with ruggedized, vandal-resistant on-street terminals designed for

Passengers in England *will find terminals at their bus stops starting next summer*

public use. These displays will have a simpler Windows-based interface offering passengers "yes" or "no" prompts.

Go back in 'virtual' time

By Ellis Booker

Arguably the world's most striking display of prehistoric artwork, France's Cave of Lascaux may soon be available to a much larger audience in the form of a virtual reality-based gallery tour.

Benjamin Britton, assistant professor of fine arts at Cincinnati's College of Design, Architecture, Art and Planning, is working on a virtual reality version of the cave and its famous wall paintings.

"I really wanted to take the viewers out the realm of the everyday and give them that sense of timelessness," Britton said, explaining why he wanted to use a virtual reality approach to the cave model. Britton's technical background is in touch-screen and interactive videodisc technologies.

Virtual reality proponents say its educational uses — such as touring a model of a Greek temple as it existed in antiquity — may be among the technology's most valuable applications.

For instance, another virtual reality project at the University of Cincinnati's Advanced Visualiza-

tion Lab involves building a series of Mycenaean temple complexes. Unlike the Cave of Lascaux project, however, this model will be used for archaeological study.

Meanwhile, some of the most advanced work in the field is being conducted at Carnegie Mellon University's Studio for Creative Inquiry. "This is the first [virtual reality] lab in an art department in the U.S.," explained Carl Loeffler, project director of telecommunications and virtual reality.

"Virtual Egypt"
This fall, Loeffler said he expects to complete the first virtual reality gallery in a "networked, virtual reality art museum." That gallery has been dubbed "Virtual Egypt."

"The goal is to create, in scale, ancient Egyptian architecture that users can walk through," he said.

The Egypt gallery will begin as a stand-alone display in a number of major national and international museums and will eventually be available on-line.

Multiuser and on-line virtual reality, a special interest of the Car-

negie Mellon team, will be demonstrated next month. On July 6, two users of Virtual Egypt — one in Pittsburgh and another in Tokyo at the International Conference on Artificial Reality and Tele-existence — will share the gallery simultaneously.

In the Cave of Lascaux tour, due to be completed next fall, students will be able to move about the cave and view Ice Age images of animals, navigating the three-dimensional environment with a joystick.

Going beyond mere presentation of the cave images in a virtual reality setting, the tour also features interactive information about the cave and its contents and images that come alive when viewers stop to look at them for a length of time. Trying to emulate what he suspects was the "ritual/spiritual" aspect of the original cave, Britton's computer model includes an area that, if the viewer stumbles upon it, will offer a secret.

Britton, who developed the project's software, was assisted by a variety of experts, including architects, virtual reality consultants and the conservator of the Cave of Lascaux.

If this is how your computer does Windows, have we got a PC for you.

Sour apples

I remember sitting amid a crowd of stunned reporters at the rollout of the Apple Lisa computer in 1983. The demonstration was mind-boggling for an audience who had never seen a graphical interface. It was pretty clear to me that this was a machine that was going to change computing forever.

And so it did, or at least the Lisa's more successful Macintosh offspring did. The problem is that the Macintosh interface has changed little in 10 years, and competitors have caught up. And that is translating into potentially big troubles for Apple.

For three years, Apple has been searching for a strategy that will take it out of the path of the Windows bullet train. It hasn't found one yet. For price-conscious PC buyers (and who isn't one these days?), the Macintosh no longer commands the price premium it once enjoyed. True, there are still more Macintosh than Windows applications. But that disparity shouldn't last long, as software giants such as Lotus and Borland de-emphasize the Macintosh platform.

The price cuts Apple must make to stay competitive will continue to savage profit margins at a time when Apple can least afford to curtail investment in new products. Apple's recent moves to spread the Macintosh interface across multiple platforms will pay off slowly, and even then won't inhibit Windows' cross-platform momentum. The Newton, even if it's a great product, will go through the same slow ramp-up that any product experiences when it's trying to create a new market. Users love the PowerBook, but that won't sustain past profit margins. PowerPC looks great, but so do many other chips. No quick fix there. The Microsoft lawsuit? Forget it.

Apple is at a crossroads. It sees the future and knows how to get there, but it has responded too slowly to recent changes in the market to do so painlessly. A particularly bitter pill for Apple to swallow is its continuing inability to define a compelling corporate computing strategy. That certainly hasn't been for lack of effort. Its Vital specification has been well-received by Macintosh fanatics but isn't playing well to a wider audience. The alliance with IBM buys Apple some legitimacy with IS, but the products aren't there yet. And then there's that burden of history. An executive in Apple's business marketing group told me last year that IS people *still* bring up the 1985 "lemmings" TV commercial in Apple focus groups.

Good luck to Michael Spindler, Apple's new CEO. He's got a tough job ahead trying to get a great company back on track.

Sometimes when it ain't broke, you shouldn't fix it. Such is the case with our Page 2 table of contents, which we have fiddled with during the past year in search of a happy medium between something that's comprehensive and easy to read. Our recent minimalist approach was a colossal dud with readers. So the original Page 2 is back, redesigned to match our new look. Thanks for all your comments.

Paul Gillin, *Executive editor*

With choice come consequences

"In users' hands" [CW, June 7] suggested that users are now in the position to dictate software and hardware selection and "then IS can figure out how to tie it all together." Unfortunately, tying things together is easier said than done. IS professionals are already giving up their evenings, weekends and holidays trying to keep the patch quilt of PC hardware and software running, and their resources and capabilities are rapidly approaching a breaking point.

With choice comes responsibility, and it is important for users to understand that their choices have consequences. Incorrect or inappropriate choices are costly and exasperate IS' corporate mission to provide reliable and rapid access to data. It is to the user's advantage to promote a highly integrated and supportable data processing environment.

Encouraging users to do otherwise only makes it more difficult to deliver usable and cost-effective applications.

Richard Finkelstein
Chicago

Readers overrule 'Objection!'

In "Objection!" [CW, June 14], Fabian Pascal demonstrates a serious misunderstanding not just of object DBMS technology, but of the claims of the object DBMS vendors. His cornerstone point — that object DBMSs claim better handling of unstructured data, yet don't deliver — is exactly backward.

The modeling and performance claims of object DBMS products relate to highly structured, complex data — the kind that requires a bewildering number of tables to represent in a normalized relational database — and a SQL query longer than this letter to retrieve. In an object DBMS, data relationships are preserved in the database, not removed as they are in relational normalization. All applications can then benefit from the presence of these relationships to avoid relational joins and achieve performance gains of more than an order of magnitude over RDBMS on comparable data.

It's interesting to observe that just as the leading networking database vendor 10 years ago tried, unsuccessfully, to stop the progress of the relational industry by incorporating some relational features into its products, the leading RDBMS vendor is now announcing plans for a major release (sometime in the future) that will focus on features already offered by several object DBMS vendors. The result will probably be the same.

David L. Gilmour
Executive vice president
Versant Object Technology
Menlo Park, Calif.

I would like to thank *Computerworld* for raising important issues in your In Depth article "Objection!" by Fabian Pascal. Pascal and C. J. Date are both fine writers and thinkers, but I would like to give a practitioner's view.

Application developers have always had to use fundamentally weak tools with many ragged edges. They are accustomed to surmounting shortcomings in the tools to produce robust application paradigms.

But the case with databases is different — relational provides a solid foundation that must be accommodated, not wrestled to the ground. From personal experience, I can attest that an RDBMS can be used to create robust, efficient applications in areas normally associated with object-oriented DBMSs, such as CAD, by using the proper paradigm, such as set-oriented processing.

Databases should not be straitjacketed by procedural thinking. The so-called impedance mismatch is really a paradigm mismatch — the belief that because object-oriented programming is better than the flawed, mainstream development techniques of the past, it is the best model for all processing. Language-oriented techniques such as pointers can be effective for dynamic, in-memory structures within an application but are inappropriate for data that is persistent and distributed.

Lee Fesperman
El Cerrito, Calif.

A (relatively) painless way to move to client/server

Mike Parker

We all know client/server is inevitable. The real question isn't whether to make the move but how quickly and radically to do it. Users want their applications in that environment NOW. But you know that rushing to migrate is a sure way to do serious injury.

You have choices: Give a speech about the dangers of distributing critical data; bow to pressure and scramble to move key databases onto servers — or compromise.

Yes, there is an acceptable middle ground.

Users want access to data from their PC and Unix workstations. You want to minimize development and migration time and maintain a centralized control of the data. The best way to satisfy both requirements is to develop applications using object-oriented approaches to screen building and data retrieval while leaving large databases on the mainframe.

In the past three years, many companies have developed object-oriented approaches not only to building GUIs but for retrieving data across platforms. Tools are available from systems vendors and third-party suppliers.

The need for centralization and enterprise-wide data modeling cannot be overemphasized. In the coming years, effective integration of data is likely to be one of the key distinctions between companies that are efficient and profitable and those that are not. At least for the moment, effective integration is most apt to be achieved by keeping databases on their original platforms.

There are products available that offer access and retrieval of data from multiple platforms. Some work; some don't.

What users want

In most cases, users don't really care where the data resides or how it is managed, as long as they can get to it. Most of them have no interest in time-consuming and unrewarding chores such as logical and physical database design, backup or installation and monitoring of databases. What they are interested in is easy access. Give them that and most will be happy to leave the rest of it in your hands.

This strategy will also give you sufficient time to accurately estimate future database and development costs. Anyone who has negotiated a client/server database contract with a vendor that charges by the total number of enrolled users can testify that the new math involved comes as something of a shock.

Client/server is a permanent shift in computing, so a full-scale transfer of data will have to take place eventually. All I'm saying is don't rush it. Too many deadlines for migration to client/server have been based on expiring mainframe leases. This may make good business sense. However, it may be even more sensible to take advantage of this shift in computing to get great lease rates for mainframes.

Developing modular, object-oriented approaches to migration of applications can give users what they want now and buy you the time you need to ensure the safety of critical data.

Parker, a systems integration consultant in Tulsa, Okla., has also worked in a number of corporate IS departments. In 15 years, he has done more data migrations and conversions than he cares to remember.

With Windows and OS/2, perception is reality

FIRE WATCH *by* John Gantz

While at Comdex last month, I attended a soiree hosted by IBM's Personal Systems Programming (PSP) division for key OS/2 developers, business partners and a handful of consultants. Excitement was high. The OS/2 2.1 release beat Windows NT out the door, and IBM could legitimately call Windows NT vaporware, especially the advanced server version.

It was a nice party. But I couldn't help feeling a general uneasiness. The other name for Comdex was Windows World, after all, and the show floor was full of hardware vendors showing their boxes running NT. Outside the door of the IBM gathering, hoardes of Microsoft velociraptors (see *Jurassic Park*) lay in wait.

Well, at least OS/2 has a powerful parent to protect it. Or does it? I find myself wondering if OS/2 isn't likely to wind up an orphan.

Certainly the IBM PC Co. will have to jump on the NT bandwagon. If Compaq, Dell or AST preinstall NT on their Pentium machines, do you think IBM won't? I haven't run into many IBM PC Co. insiders who believe OS/2 can help them sell iron.

So what's left for OS/2? A useful niche, perhaps, as a client/server operating system in IBM-only shops or as a specialty development system, but not the volume market Microsoft expects for Windows NT or further high-end releases of Windows.

In fact, I expect that sooner or later (probably sooner) IBM will require that development of future versions of OS/2 and related products, such as LAN Manager, be funded out of revenue. That will be a tall order in a market dominated by Microsoft and Novell.

I have data to support a contention that NT is, even before shipment, the mainstream 32-bit operating system for Intel platforms. In a recent survey of 200 volume PC buyers and 100 resellers, my company found that most respondents expected NT to be installed on more PCs than OS/2 will be within 18 months, even among current OS/2 users and resellers.

Worse for IBM, users of OS/2 who had evaluated NT rated NT higher on some features, such as the Workplace Shell user interface, the System Object Model and technical support.

To IBMers and OS/2 developer advocates (and I've talked to more than a few), these results are crazy. Anyone proficient in the Systems Object Model would swear it is light-years ahead of anything NT has. And more than a few technical reviews rate Workplace Shell well above Windows. Besides, NT still isn't shipping and will require 16M bytes minimum when it does. What gives?

What gives is Microsoft's power to brainwash developers and users, the ubiquity of Windows and (compared with IBM) precision drill-team execution. A couple of weeks ago, for instance, I was part of a three-city road show for users of a major PC vendor. Also on the docket were three different Microsoft district managers talking about NT and Microsoft's strategy. All three had the party line down pat. To get a full picture of IBM's strategy, you have to talk to people in Austin, Texas; Boca Raton, Fla.; Somers, N.Y.; and who knows where else.

OS/2 still has some momentum. More applications come every day, more pilot systems are being rolled out across whole departments, and IBM has been debugging it for years. But there's little doubt in my mind that NT will, sooner or later, roar past OS/2 in applications available, platforms supported, units shipped and profits made.

With luck, OS/2 will be successful enough to sell Microsoft on the idea of future joint development that merges the two operating systems. If that happens, we'll have things back the way they were supposed to be at the start of all this.

Gantz is senior vice president of International Data Corp., where he is responsible for all research and consulting in desktop automation and workgroup and office computing.

WHY WE'RE COMPLETELY TWO-FACED ABOUT UNIX.

Charles Babcock

Relational backlash

You know that what used to be the younger generation isn't so young anymore when its leaders start taking shots at the talent coming up behind them. That's what's happening now with some of the proponents of relational databases as they train their sights on object database management systems (ODBMS).

This is strange because at one time, the hoary guardians of hierarchical and Codasyl systems said the same sort of things about relational. John Cullinane, president of the late Cullinet Software, used to tell me, "IBM may ship a lot of copies of DB2 but they're all sitting on the customers' shelves." *Right.* Cullinet was acquired by Computer Associates about a year later.

Once again, you can hear the volume of disparaging comments beginning to pick up: "You don't need object-oriented systems. Relational can do everything they can do. ... You can store unstructured data in relational tables. ... Object-oriented results in a loss of data independence, not a gain." And so on.

It is hard for relational advocates, having been on the leading edge for 10 to 12 years, to wake up and find that fashionable opinion has moved on to something else. The temptation is to tell the upstarts they don't know what they're talking about.

At their worst, the relational defenders say ODBMSs represent a step backward. ODBMSs resemble the old Codasyl databases with their dependence on pointers to locate stored objects, but it is hard to see this as a vice if the systems then manage objects effectively.

Object databases answered a real need for C++ and Smalltalk programmers who needed a place to store their persistent data. CAD and CAE users in particular sought to store objects, and object-oriented databases sprang up to serve that purpose.

Whatever their deficiencies, ODBMSs succeed in dealing with objects as objects. They do not need to break them down or flatten them as relational systems do. There are a variety of methods used, but the chief one is to assign each object its own identifier and then use that identifier to locate the object intact.

The nature of this system gives object databases a claim to speedier retrieval because there is no mathematical basis on which to do more sophisticated operations such as joins. Clearly relational systems would retain advantages in dealing with massive amounts of tabular data. But relational advocates are reluctant to give object databases their due.

ODBMSs are built as object-handling systems capable of preserving the characteristics of the objects they store — classes, inheritance and messaging.

Because objects are a combination of data, processes and messages, it is difficult to restrict them to a few simple data types. To store an object, "you have to have the processes inside the database as well as the data," notes James Odell, chief methodologist at Inference Corp. and co-author with James Martin of *Principles of Object Oriented Analysis and Design.*
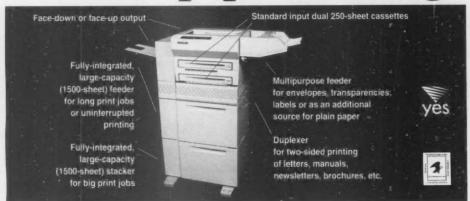
Relational systems can store objects, but to do so, they must break them down into components and store them in tables. In an analogy that originated with Esther Dyson, editor of the newsletter "Release 1.0," this is like driving your car home and then disassembling it to put it in the garage. It can always be reassembled again in the morning, but one eventually asks whether this is the most efficient way to park a car.

Relational systems were designed to deal with a few data types within the confines of a strict logic. Object databases were designed to deal with the rich variety of data types in a few limited ways. Relational advocates can't wave a magic wand and make the difference go away.

Babcock is *Computerworld*'s technical editor. His MCI Mail address is 575-2737.

Ever since
Apple, IBM and
Motorola
formed their
alliance,
people have
expected
something big.

Well, it's not so big, but it's amazingly powerful.

	Intel Pentium	PowerPC 601™
Frequency (MHz)	66	66
SPECint92	64.5	>60
SPECfp92	56.9	>80
Power (worst-case)	16w	85w
Die Size (mm²)	262	120

Introducing the PowerPC™ family of microprocessors from Motorola.
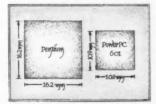
How powerful is our first tangible result of the Apple, IBM, Motorola alliance? Unlike any other microprocessor, the PowerPC Microprocessors have the power to change the course of computing.

The PowerPC family of microprocessors will bring unprecedented high performance to everything from hand-held computers to desktop computers to supercomputers. It will run circles around its only real competitor, the Intel®

POWERED BY MOTOROLA

(actual size)

Pentium™ microprocessor, and it will do so at a fraction of the cost. It will run today's standard computer operating systems, as well as those that are being developed for pen-based and object-oriented computing. In fact, PowerPC Microprocessors will play a pivotal role in the imminent convergence of computing, communications and lifestyle products.

Yes, the PowerPC Microprocessors from Motorola have the power to change the course of computing.

PowerPC Microprocessors. *Changing the course of computing. For the better.*

Ⓜ *MOTOROLA*
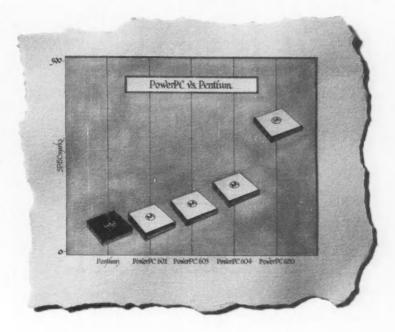
It has the power to blow away Pentium.

The latest in the line of X86-compatible microprocessors from Intel, Pentium, is quite powerful. However, it is not nearly as powerful as the PowerPC family of microprocessors from Motorola.

The first of Motorola's PowerPC Microprocessors, the PowerPC 601™ Microprocessor, will bring workstation-like performance to low-cost PCs. Its integer performance (how fast it handles basic computer functions) is equal to Pentium's. In floating-point performance (the speed you need to crunch numbers, run graphics, video, voice and the like), the 601 is a full 40 percent faster than Pentium, with no loss in integer performance.

While the 601 outruns Pentium, it actually runs cooler, because it draws only 8.5 watts of power to 16 watts for Pentium.

POWERED BY MOTOROLA

It has the power to lead a revolution.

Personal computers are on the verge of becoming infinitely more useful, more usable, more communicative and more mobile than they are today. A number of advanced technologies—real-time video, wireless networks, voice and handwriting recognition and object-oriented programming, among many others— are ripening, converging and becoming affordable all at once.

The one thing all those technologies need is extraordinary processing power. Processing power that only PowerPC Microprocessors can deliver.

POWERED BY MOTOROLA

Motorola's family of PowerPC

Microprocessors will serve

computing needs from hand-held

computers to supercomputers.

The 601, 60-80 SPECmarks, is

designed for high performance,

low cost personal computers.

The 603 is a low-wattage

microprocessor perfect for

battery-powered hand-held

and other mobile computers.

The 604 is a high performance

microprocessor for high-end

PCs, workstations and servers.

The 620 ultra-high performance

microprocessor, 200-400

SPECmarks, is right for

high-end workstations,

servers and supercomputers.

In its various forms, the PowerPC Microprocessor will provide the right combination of high performance, small size, low power consumption and low price that make it the only real choice for an incredible variety of applications. From massively parallel central servers, desktop computers and pocket-sized digital notepads to voice/data communications systems and automotive control units.

In the very near future, computing will look very different. That difference will be powered by PowerPC Microprocessors from Motorola.

PowerPC Microprocessors. *Changing the course of computing. For the better.*

Ⓜ **MOTOROLA**

It's as open as it is powerful.

Perhaps most importantly, PowerPC Microprocessors soon will run the new processor independent operating systems, including the one forthcoming from Taligent (the Apple/IBM joint venture); as well as the real-time operating systems for embedded control and those emerging for mobile, pen-based computing.

PowerPC Microprocessors from Motorola. From supercomputers to pocket computers, the world is now open.

PowerPC Microprocessors. *Changing the course of computing. For the better.*

(M) *MOTOROLA*

Of course, power has its price.

That price is low, as in personal computers priced under $2500 that are faster than any PC on the market today.

You see, PowerPC Microprocessors from Motorola not only deliver significantly more power than Intel's Pentium microprocessor, they deliver it at a fraction of the cost.

The reasons are quite simple. Through Motorola's superior design and manufacturing technology, we've packed more power into fewer transistors. We deliver that power on a chip that's less than half the size (120 square millimeters vs 262 square millimeters).

POWERED BY MOTOROLA

$450

$965*

Essentially, that means we can manufacture over twice as many microprocessors in the same time and space as Intel can.

PowerPC Microprocessors from Motorola. For those who make computers, they offer the opportunity to build high performance, low cost computers profitably. For those who buy computers, they will cost you a lot less to be powerful.

PowerPC Microprocessors. *Changing the course of computing. For the better.*

(M) MOTOROLA

PowerPC Microprocessors.

Changing the course of computing. For the better.

To take a closer look at the future of computing, call Motorola today at 1-800-845-MOTO.
We'll be happy to provide you with more information, including our free PowerPC Information Pack.

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PCs AND SOFTWARE
PORTABLE COMPUTERS

Desktop Computing

VIRUS AWARENESS, 52
APPLE ACCELERATES, 54
CUSTOMER SERVICE, 56

David Coursey

Microsoft for all

If reports are to be believed, the Feds are finally starting to look at accusations that Microsoft deliberately hid operating system features from other application developers. Microsoft denies any wrongdoing, and the issue is likely to wind its way around Washington and Redmond for quite some time, tarnishing a company that is most certainly a national treasure.

So, instead of investigating Microsoft, I'd like to make a "modest proposal" of my own, one that would really make Microsoft a national asset. Being a reporter, I'll shift into my best Associated Press style to share my idea with you. Here goes:

WASHINGTON, D.C. — In a surprise move, President Bill Clinton today announced a $75 billion plan to nationalize Microsoft Corp. and create a special tax to provide free software to all Americans. Clinton also appointed the company's co-founder, William H. Gates III, to a lifetime term as U.S. technology czar, a newly created cabinet-level post.

"It used to be a chicken in every pot, but today we need a computer in every home and that requires software," Clinton said in announcing the federal buyout, which will pay Microsoft shareholders the full value of the company's stock at the close of trading yesterday. Vice President Al Gore, who had promoted the buyout idea in private White House discussions, will shepherd the deal through Congress, the president said.

Export strategy

Clinton described Microsoft as a key component in his plan for a resurgence in American trade overseas.

Gates, who founded the company as a teenager, will remain in day-to-day control of Microsoft but will gain new responsibilities as the nation's chief strategist on technology policy.

"There is no one more qualified, more able, than Bill Gates to guide America's development of the technology necessary for an information-based economy," Clinton said. "In his government role, Bill will be able to develop policies that

Coursey, page 52

Xerox develops OCR for Windows

By Michael Vizard
PALO ALTO, CALIF.

■ Xerox Imaging Systems, a wholly owned subsidiary of Xerox Corp., is about to deliver a $99 optical character recognition (OCR) software package for Windows. It converts paper documents into an editable format that is compatible with word processors from companies such as WordPerfect Corp., Microsoft Corp. and Lotus Development Corp.

Based on technology developed at the Xerox Palo Alto Research Center, TextBridge makes use of neural network technology and other mathematical algorithms to convert digital images that were either faxed or scanned into PC file formats that are compatible with the leading word processing, spreadsheet and database software packages. Those documents can be written in English, French, Italian, German or Spanish using virtually any typeface.

"This is one of the few software packages that actually does what it is advertised to do," said Ed Letourneau, president of Hydro America. Inc., a consulting firm for electric power plants that is based in Bennington, Vt.

Thus far, Letourneau said he has used a beta-test version of TextBridge to import about 3,000 pages of technical documents into a file format that is compatible with FrameMaker from Frame Technology Corp. in San Jose, Calif., and Lotus' Manuscript offering.

"TextBridge is about as fast as any of the OCR packages out there, and it's far more accurate," Letourneau said.

TextBridge, which includes a Dynamic Data Exchange facility to link it with other Windows applications, will ship next month.

Transition time for pen

First word processor for digital ink debuts to applause

By Michael Fitzgerald

Pen computing is dead! Long live pen computing!

There is a new model for the pen computing market. A slew of announcements seeks to meld pen input technology with conventional computing and make good on promises made by vendors six months ago.

"Pen computing is not a market, just like wireless communications is not a market," said Richard A. Shaffer, editor of "Computer-Letter," an industry newsletter in New York. "They're technologies, and customers don't buy those. They buy real benefits."

Shaffer said the benefit of pen input is the way it enhances highly mobile computers that are too small to effectively accommodate a keyboard.

Recent vendor announcements signal a trend toward pen input being seen as part of mainstream computing, rather than something unto itself:

▶ Pen pioneer **Grid Systems Corp.**, following its sale to AST Research, Inc., added to its Convertible line. The initial Convertible 386, which accepts both pen and keyboard input, is Grid's current bestseller. The Grid Convertible 486 uses an Intel Corp. 25-MHz I486SL chip. It is also one of the first portable systems to bundle socket services for the Personal Computer Memory Card International Association slot. The product will retail for $2,699 when it debuts in July.

▶ After an aborted attempt a year ago, **Zenith Data Systems** also has added pen computing to its list of technologies. The Z-NotePad 425LN turns the Z-Note 425LN notebook into a combination notebook and pen-based computer, much like the Convertible, but with a detachable screen. The Z-NotePad will cost $2,999 and is shipping now.

▶ **Aha Software Corp.**, a Mountain View, Calif., start-up, introduced InkWriter, which allows users to manipulate text entered with a pen without having to first convert the information to computer characters. Effectively the first word processor oriented for pen input, InkWriter can also turn ink sketches into computer graphics. It will cost $249 but will be introduced at $199 in July and August.

▶ **Borland International, Inc.** and Redwood Shores, Calif.-based **Communication Intelli-** gence Corp. said they have developed pencentric objects for Borland's dBase IV. This will allow dBase to recognize and use data that has been entered with a pen.

▶ **Notable Technologies, Inc.** in Oakland, Calif., and **Compsoft Services, Inc.** in Greenwich, Conn., said they would jointly develop new host-to-pen computer-oriented communications software for Go Corp.'s PenPoint operating system.

▶ **Dauphin Technology, Inc.** in Lombard, Ill., said it is shipping its DTR-1, a Cyrix Corp. 486SLC-based pen and keyboard mobile computer that weighs less than 4 pounds.

▶ **Compaq Computer Corp.** also cast its name into the ring of vendors that support pen computing when it announced it would build technology into a new family of computers called Mobile Companions.

Of these announcements, observers said they were pleased to see more 486-based pen computing hardware because pen-oriented software has run slowly on 80386 technology. The product that seemed to intrigue them most was Aha's InkWriter.

"Aha is a major step in mobile computing because it makes it more apparent that you can in fact do real work with pen input that has nothing to do

Grid Systems' Convertible 486 *accepts input with either a pen or a keyboard*

with handwriting recognition," Shaffer said.

Doug Smith, president of Filbitron Systems Group, Inc., a systems integrator in Toronto, called Aha's InkWriter an "enormous" development and said it could make it possible to computerize patient care in hospitals. "That's a $900 billion market that can't be computerized because it's entirely driven by ink," Smith said.

Observers said Aha was the first company to enter the market for pen-based word processing. Word-Perfect Corp., which has discontinued development of PenPerfect, said it was still looking at pen technology but had nothing immediately planned.

Separately, AT&T, which has started a major push behind the EO, Inc. Personal Communicator, clarified its marketing plans. Harriett Donnelly, managing director for the personal communicator business at AT&T, said the company has decided against a seeding plan it was considering, in favor of other ideas. For instance, AT&T is negotiating with the National Basketball Association to outfit NBA teams with the Personal Communicator.

> InkWriter could make it possible to computerize hospital patient care, a $900 billion market now entirely driven by ink.
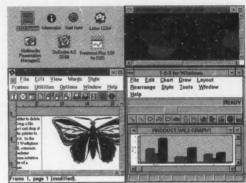
Now's

You wanted the power to choose from a world of different applications. DOS applications. Windows™ applications. OS/2® applications. OS/2 2.0 gave you the power. And the response was impressive, to say the least. Over two million copies shipped in less than one year. More than 1,200 OS/2 applications already available*. But now you want more. More features. More functions. More applications to choose from. That's why we're introducing OS/2 2.1.

The new OS/2 2.1 lets you run the latest Windows 3.1 applications, in addition to the DOS, Windows and OS/2 applications you can already run. We've also added TrueType fonts, select Windows applets, File Manager and support for Windows 3.1 printer and display drivers, including 32-bit seamless SVGA support. And now you can start DOS and OS/2 applications from a WIN-OS/2 session, too.

Portable users will be glad to know that OS/2 2.1 provides industry-standard Advanced Power Management (APM) support, to help extend battery life.

your
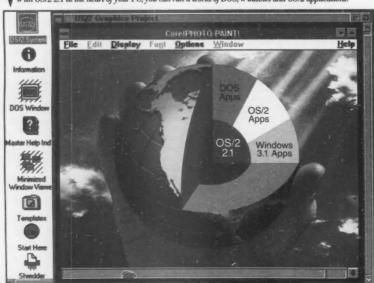
▲ *There's no need to buy DOS and Windows to run DOS and Windows applications.*

▼ *With OS/2 2.1 at the heart of your PC, you can run a world of DOS, Windows and OS/2 applications.*

We've made the cursor larger so it's easier to find your place on the screen. And OS/2 2.1 continues to exploit the very latest in technology. You'll find improved support for multimedia applications and pen-based capabilities, along with built-in CD-ROM and AS/400® terminal emulation support.

Of course, OS/2 2.1 still gives you true pre-emptive multitasking, superior OS/2 Crash Protection™ and the easy-to-use object-oriented Workplace Shell™ interface. All the features that made Version 2.0 an award-winner. But now, you also get a whole new world of possibilities.

OS/2 2.1 is now also available on CD-ROM. It comes with exciting

Viruses continue to wreak havoc at many US companies

By Gary H. Anthes

Shortly after the White House announced that it had hooked up President Bill Clinton and Vice President Al Gore to the Internet, Gore said, "The Clinton administration enthusiastically supports National Computer Virus Awareness Day."

White House officials refused to say whether novice Internauts Bill and Al had met Michelangelo, Dark Avenger, Jerusalem, Stoned or any other digital demon, but such a high-level statement of support for virus awareness would have been unimaginable just a few years ago.

Even discounting the tendency for hype that has plagued the virus and security issue, corporate computerdom will see things get worse before they get better, computer experts said. Among the statistics put forth at the June 9 Virus Awareness Day kickoff on Capitol Hill were these:

• In a survey of corporations by the National Computer Security Association (NCSA) and Dataquest, Inc., 63% of respondents said they had battled a computer virus.

• Viruses will cost American business $2 billion next year.

• More than 2,100 viruses are known to exist and 50 more are created each month.

• The average virus attack affects 142 PCs and takes 2.4 days to eradicate. One quarter require more than five days to correct.

Myths abound

Many corporations refuse to discuss their experiences with viruses or their efforts to avoid them. But 3M Co., which sponsored Virus Awareness Day with the NCSA, did not hold back. Virginia H. Hockett, information technology manager at 3M and an alumna of the National Security Agency, said a survey of employees showed that while 98% had heard of computer viruses, the majority were not sure what viruses do.

"The majority . . . regarded antivirus software as a complete cure . . . [and] more than 55% answered that they had spent no time in the past year educating themselves on how to prevent or combat viruses," Hockett said.

NCSA board member Peter S. Tippett, director of security and enterprise products at Symantec Corp., said the following common misconceptions still exist:

• "Viruses will eat your data." In fact, viruses rarely destroy either data or software. The biggest problem is just getting rid of them.

• "Computer bulletin boards are a leading source of viruses." No. The common boot-track-type viruses cannot be easily transmitted this way. No corporate policy related to bulletin boards will have a noticeable impact on the virus problem.

• "Most viruses travel in pirated software; few are transmitted via data-only diskettes." Just the opposite is true; while viruses do not infect data per se, they do infect diskettes carrying data.

• "There are good viruses and bad viruses." There are no benign viruses; because all by definition replicate without the user's knowledge or consent, all must be removed, sometimes at considerable expense.

• "Viruses come in waves." No, news of various viruses — for example, Friday the 13th, Columbus Day and Michelangelo — comes in waves, but the viruses themselves have grown steadily and predictably.

On the rise

Micki Krause, minicomputer and microcomputer security manager at Rockwell International Corp., said Rockwell saw virus incidents peak at 600 in 1990, then decrease as stringent antivirus measures were taken. Now, however, she said they are on the rise again at Rockwell as the number of viruses increases geometrically.

"Viruses are being written so fast that antivirus software can't keep up," Krause said. One infection cost the company an estimated $44,000 to cure.

Virus venom

Viruses can have detrimental effects on the group, none more damaging than the loss of productivity

Loss of productivity	62%
Interference, lockup	41%
Corrupted files	38%
Lost data	30%
Unreliable applications	24%
System crash	23%
Loss of confidence	20%
Don't know/Refusal	9%
Corrupted E-Mail	4%
Threat of job loss	3%

PERCENT OF PCs
BASE: 600,000
MULTIPLE EFFECTS REPORTED

Source: Dataquest, San Jose, Calif.

Protection policy

3M's antivirus policy contains the following provisions, among others:

• Change passwords every 30 to 90 days.

• Write/protect files when possible so that an error will occur if a virus tries to modify the file.

• Use "shareware" only under strict guidelines and "freeware" not at all.

• Never run programs at work obtained from university systems.

• Learn the signs of a virus attack, which include unexplainable loss of free memory, programs taking longer to load or execute, changes in file or program size, print routines that stop working, "freezing up" of the computer, strange beeps or messages or computer reboots in the middle of a process.

TransferPro unveiled

Unix given access to Mac, MS-DOS files

By Christopher Lindquist

LOS ALAMOS, N.M.

Digital Instrumentation Technology, Inc. has announced the availability of TransferPro, a software product that allows Unix systems to read and write to Macintosh and MS-DOS files.

With TransferPro, users can perform most file-related tasks on DOS and Macintosh disks, including copying and moving files and directories and formatting

> DIT began life in 1989 developing technology for Next, Inc. system floppy drives

and browsing through file contents. Various file-filtering techniques ease the transfer of files from one system to another, including file name filters that rename files in accordance with the standards of each system.

TransferPro is currently available for Sun Microsystems, Inc. systems and Silicon Graphics, Inc.'s Iris and Personal Iris systems. A version for Hewlett-Packard Co. Unix workstations is due shortly. Pricing begins at $99.

Coursey

will affect all Americans."

Dubbed a "Microsoft tax" by one GOP senator, Clinton's National Software License Fee will be collected as a surcharge on the income taxes paid by Americans with annual household incomes higher than $50,000, a treasury department official said. Revenue from the tax is expected to total $15 billion, or $60 for every American. For that amount, Clinton promised free software for all, including the latest interactive games and business applications. New software will be released through post offices and other federal agencies, although long-term plans call for distribution via cable television.

'No comment'

Administration officials would not comment on what effect the Microsoft buyout might have on the company's reported plans to form a new company, CableSoft, to create software for interactive televisions and other devices. A White House spokesperson said talks between Microsoft, media giant Time Warner, Inc. and cable television leader Tele-Communications, Inc., would continue. Microsoft will be in a much stronger bargaining position as a result of the buyout, the spokesman said.

It is unclear whether Gates' administration position might enable him to pressure the Federal Communications Commission to accept Microsoft-inspired plans for interactive cable television or a proposed national telecommunications system designed to bring entertainment and data networking services to U.S. homes and businesses. The president's strong endorsement of Gates, however, clearly suggests the 39-year-old billionaire might have carte blanche to develop policy as he pleases.

The moves were widely hailed on Capitol Hill as important elements in the establishment of a national technology policy, with both Democrats and Republicans predicting swift approval by Congress.

Others were not so sure, however, criticizing the tax allowing any

> The president's strong endorsement of Gates clearly suggests the 39-year-old billionaire might have carte blanche to develop policy as he pleases.

American unlimited use of Microsoft software and also providing government funding for software companies adversely affected by the nationalization move. One Republican senator vowed to fight Clinton's proposal, even against the wishes of the Senate's GOP leadership.

Job for Jobs?

In a related move, the president also said he was revising his controversial jobs bill to provide $16 billion to fight unemployment at object-based operating system companies in Redwood City, Calif. The money would specifically target Next, Inc., where former computer whiz-kid Steve Jobs continues a fight for survival.

Republicans have already said the jobs bill is a sham, not intended to provide a job for Jobs but to distract Ross Perot, who holds a major stake in Next, from entering the 1996 presidential campaign.

Coursey is editor of "P.C. Letter," a San Mateo, Calif., industry newsletter. His MCI Mail address is 558-4460.

Mac accelerator cards step on the gas

By James Daly
DALLAS

Tired of being jealous of the guy down the hall who always has the speediest machine around?

If you're a user of an older Macintosh, you have a new ally in Applied Engineering, Inc., which recently unveiled a series of accelerator cards for older Macintoshes.

The TransWarp Eclipse 4300, 2300 and 1300 cards offer the ability to dramatically increase the speed of Macintosh models LC, LCII, LCIII, Performa 400, SE, Classic, Color Classic, Mac II, IIX, IICI, IISI, IIFX, IIVI and IIVX.

Applied Engineering officials say the boards can boost the computational power of even the most sluggish Macintosh by as much as 12 times.

The boards use two acceleration methods: the addition of Motorola, Inc. 68030 and 68040 chips and a technique called "static RAM caching."

A static RAM cache is a very fast section of memory that resides between the main motherboard and the CPU. It works by taking instructions from the slower motherboard memory and placing them in fast static random-access memory. The instructions are executed much more quickly, resulting in greatly improved performance.

With optional support for Apple's Virtual Memory feature, users will be able to use hard disk space as if it were system RAM.

The boards could have an enormous market among the millions of users of older Macintosh models. Pieter Hartsook, editor of the Macintosh-geared "Hartsook Letter" in Alameda, Calif., estimated that there are 10 million Macintoshes on the market, many of them older machines.

All models of the TransWarp line are expected to be available this summer with prices starting at $199.

XyWrite for Windows set for August delivery

By Michael Vizard
BALTIMORE

Diehards who have remained loyal to the XyWrite word processing software from The Technology Group are about to have their patience rewarded with the long-awaited arrival of XyWrite for Windows.

Due in August, a Windows implementation of XyWrite will bring many professional writers and editors into the Windows mainstream for the first time. Currently, XyWrite users, many of whom are professional journalists, must exit Windows in order to access their Xy-Write word processing software under DOS.

"I've got a late beta version of XyWrite for Windows, and I haven't been able to crash it yet," said Tony Kahn, a producer for American Public Radio in Boston.

Added features

New features in XyWrite for Windows include the ability to create multiple notebooks that hold related files, the ability for writers to create their own shorthand notations that are then automatically expanded into full proper names, and the ability to create style sheets that maintain uniform formats across mutiple projects.

In addition, XyWrite for Windows includes a command line that allows users to reduce keystrokes and mouse clicks. It also provides a library of buttons that users can customize with the commands they use most often.

Kahn, who acknowledged that he is not much of a Windows enthusiast, said he prefers XyWrite over other word processing packages because it is simpler to use.

"With XyWrite, I don't have to go through multiple commands and menus to change a format," Kahn said.

Priced at $495, XyWrite for Windows requires 2M bytes of random-access memory and anywhere from 3M to 9M bytes of disk space.

Firm finds Support Advantage with ProActive Software

By Christopher Lindquist

"Customer service" is just another popular catchphrase — unless your customers are not getting it.

So when Boehringer Mannheim Corp. decided to install a major new system for its 2,000 users, it also set out to find a third-party help-desk package to bring its support services to a higher level.

Boehringer had previously used an in-house application that Pete Van Dyke, manager of MIS administration, described as an "electronic notebook" with limited functionality. "Basically all we could do was log calls," he said.

That was not going to be sufficient when the new system went on-line. Van Dyke was looking for reporting, escalation and prioritization capabilities to keep better track of support calls and, he hoped, make the entire process more efficient and less expensive along the way. "Any time you reduce confusion in an organization and make it more efficient, there are cost savings in there," he said.

After investigating a variety of packages, Boehringer settled on three from which to choose. Unfortunately, in the final evaluation, none of the three proved up to the task, Van Dyke said. So the company took a step back and returned to ProActive Software, Inc., a Mountain View, Calif.-based company that had previously refused to submit a quote for the job because of Boehringer's tight time frame, Van Dyke said.

Good match

This time they struck a deal, and Boehringer took part in the beta-test program for ProActive's Support Advantage package, which provides work-flow automation for support personnel.

With Support Advantage, Van Dyke said, support calls go into a two-person support desk where they are either answered or referred to the appropriate person on the staff of nearly 100 support personnel. If the request for support is not answered within preset time limits, it is automatically sent to the next person in line until someone deals with it.

In emergency situations, the system can also call a support person's pager. That technician can then log on to Support Advantage at the nearest workstation and retrieve information about the problem.

Support Advantage soon had noticeable results, Van Dyke said, noting that "the backlog of calls has diminished." While Van Dyke said he is pleased with the additional efficiency, he is still waiting to determine just how much money Support Advantage is saving him.

"I'm hoping to get some reports to determine some metrics," Van Dyke said, noting that ProActive is still working with him to produce report modules to do just that.

> **Personal design**
>
> Boehringer found at least one plus to being a beta-test user for Support Advantage: ProActive was willing and able to modify the program to suit the company's needs.

New Products

Macintosh product

MicroTouch Systems, Inc. has introduced Mac 'n Touch SA-14 Monitor, a high-resolution touch-screen monitor designed for the Macintosh.
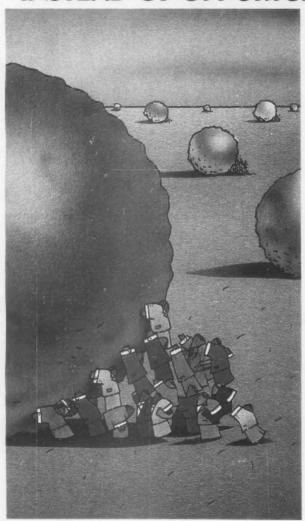
The product can be used for kiosk, business, multimedia or training applications. Mac 'n Touch is composed of a 14-in. display, controller and a Mac OS driver, the company reported.

The Mac 'n Touch Monitor costs $1,495.
▶ *MicroTouch Systems
55 Jonspin Road
Wilmington, Mass. 01887
(508) 694-9900*

Data storage

RYBS Electronics, Inc. has started shipping Version 8.17 of AtLast Upper Memory Optimizer.

This version offers easier integration and more available DOS memory. According to the company, an additional 5K to 30K bytes of usable conventional memory is available because the product includes full support and improvement of MS-DOS 6.0.

To continually provide maximum available DOS memory, AtLast can independently track and optimize each configuration option.

According to the company, a Smart TSR feature optimizes utilities to ensure the best use of memory space.

AtLast costs $79.95.

▶ *RYBS Electronics*
3109 28th St.
Boulder, Colo. 80301
(303) 444-6073

Peripherals

APS Technologies, Inc. has started shipping Toshiba Corp.'s 213M-byte, 2½-in. internal hard drive.

According to the company, the APS Toshiba 213 was designed for use with every Apple Computer, Inc. PowerBook, including the new PowerBook 165C.

The APS Toshiba 213 is said to have sustained Small Computer Systems Interface transfer rates as high as 1,300K byte/sec. It delivers an access time of 27 msec with an average seek time of 12.1 msec.

The internal version of the APS Toshiba 213 costs $599. The external AC-only version costs $659, and the AC/DC version costs $729.

▶ *APS Technologies*
6131 Deramus
Kansas City, Mo. 64120
(816) 373-5800

Database management

Progress Software Corp. and Q+E Software have announced that Q+E now supports the Progress relational database management system.

Through Q+E Software products, users will now be able to access Progress-based data via an assortment of Windows tools.

The Q+E Database Editor, the Q+E Database Library and the Q+E Multi-Link/VB are the three Q+E Software products offered with Q+E Software for Progress.

The Q+E Database Editor provides Dynamic Data Exchange and dynamic information exchange between any Windows application or tool that supports the Progress RDBMS.

A lower level, SQL-based interface to the Progress RDBMS is offered in the Q+E Database Library.

Microsoft Corp.'s Visual Basic applications are linked to more than 20 PC and SQL databases, including Progress with the Q+E Multilink/VB.

Q+E Database Editor costs $299. Q+E Database Library and Q+E MultiLink/VB each cost $399.

▶ *Progress Software*
14 Oak Park
Bedford, Mass. 01730
(617) 280-4000

JV Consultants has started shipping DocsDB Pro Version 4.0, a document manager for Microsoft Corp.'s Word for Windows.

According to the company, this version allows full integration among portable, office and network computers.

When users copy documents from one machine to another, the DocsDB Pro naming structure is simultaneously transferred to a new location.

A database created by DocsDB Pro has categories called Subjects, Folders and Cabinets. File names of up to 255 characters in length can be assigned.

Native Word for Windows commands such as File Open, File Close, File Save and File Save As are used.

DocsDB Pro requires Windows Version 3.0 or higher and Word for Windows Version 2.0 or higher installed on a hard disk.

DocsDB Pro costs $129.95.

▶ *JV Consultants*
3013 Yale Ave.
Marina Del Rey, Calif. 90292
(310) 827-8786

*H*ewlett-Packard computer systems helped Spalding's worldwide revenue grow four times faster than the industry average.

"Our HP 3000s have taken the worry out of daily operations and future growth. They leave us free to concentrate on customer service."

— Bard White, Spalding's CIO and Worldwide Director of MIS

*I*nstead of investing in mainframes, Spalding looked for a better way to manage its growing business. A way that would make the 115-year-old sporting goods company more responsive to customer demands around the world and save money at the same time.

So HP developed a networked solution built around powerful HP 3000 Business Systems in a dozen data centers and distribution hubs worldwide. This gives Spalding instant global access to management information, helping them react quickly to changing consumer needs, and deliver products faster.

To learn more, call 1-800-637-7740, Ext. 7460 for our free video, *Strategic Computing*, starring some on-the-ball business leaders. It shows why you might want to rethink your company's game plan.

Think again.

HEWLETT PACKARD

Workgroup Computing

Replication catches on, but approaches still differ

By Kim S. Nash

■ Hot on the heels of Sybase, Inc.'s splashy introduction of Sybase Replication Server this month, The ASK Group, Inc.'s Ingres Products Division confirmed that it will start beta-testing a similar replicator this summer, according to an Ingres executive.

The as-yet unnamed product grew out of an internal tool that Ingres consultants have used for several months to set up distributed database architectures at more than 20 U.S. customer sites, said Russ Donovan, director of product marketing at Ingres in Alameda, Calif.

The Ingres replicator is due to ship by the end of the year, he said. Meanwhile, Oracle Corp. and Informix Software, Inc. have touted the built-in replication features of their latest database engines.

But positioning is strictly in the database market, said Colin White, analyst at Database Associates, a consulting firm in Morgan Hill, Calif. "What it comes down to is what works, and we just haven't seen enough yet from the newest products to decide which is the better approach," White said.

Better tools

Despite the hype, the concept of data replication is not new. But the tools for doing it have improved with the latest round of database upgrades from the major players. That is because users are more loudly demanding the ability to

> Ingres plans to ship a replication server this year. It will be an amalgamation of the approaches of Oracle and Sybase, containing two-phase commit and other replication features, said Ingres' Russ Donovan.

manage databases and keep changing data in sync across different geographic locations, analysts said.

For example, a brokerage with headquarters in New York that makes stock trading decisions based on currency exchange rates in London and Tokyo would want to keep that data as current as possible in all locations. Replication lets databases running in those spots pull information at regular intervals from other locations, keeping each database synchronized even in the event of network failure.

"Doing distributed database is not as easy as setting up a replicator," White warned. "But that is a big part of it."

Echoing the sentiments of other observers, White noted that database vendors can go only so far in making client/server a reality for big worldwide users. Internetworking products and their applications have to be built and built solidly, he said. And that is the responsibility of more than one vendor.

In a nutshell, distributed database schemes let databases at two, 10 or many more sites share updated data at regular intervals. A typical scenario: Several local retail stores regularly feed sales and inventory data to a corporate-level database at the retailer's headquarters. The corporate database, in turn, might send duplicate information to databases in another location, which would act as backup in case of a disaster or downtime at headquarters.

Efficient data replication, whether the func-

tion is built into database engines or available as a separate product, is key to distributed computing, observers agreed. A good replication plan, they said, must accomplish the following important tasks:

• Duplicate and send data according to user-defined parameters, such as every five minutes or each time a certain threshold is reached.

• Continue to function and remember information and changes when system or network failures happen.

• Synchronize data changes with databases in different locations so local users do not work with stale information.

The differing approaches of two database powerhouses illustrate the basic replication debate, according to David McGoveran, an analyst at Alternative Technologies, a consulting firm in Boulder Creek, Calif.

Keeping watch

Sybase's Replication Server contains a Log Transaction Monitor that looks over the shoulders of Sybase database users to see what changes they make to data and whether those modifications should be sent to other locations. If a receiving locale is down as a result of a network failure, for example, the Log Transaction Monitor sends the data until it is accepted.

The Oracle 7 database keeps a separate table of data being modified — a snapshot — with each row identified. Predefined changes trigger a message to the engine to send the information to other databases. Oracle's two-phase commit requires that the sender and receiver agree to exchange data at a specified time.

Which scheme is better often depends less on the technology than on the know-how of the database administrator, McGoveran said. Plus, although users will probably adopt the replication technique of their database vendor, widespread adoption of the concept will not occur with the first release of the technology, he noted.

"You don't want to risk a critical application on first-generation product," he said.

DBMS

Approaches to data replication vary among the top database makers:

• **Sybase** offers Replication Server, a separate product that works in conjunction with the database engine. It is shipping now for Sun Microsystems, Inc. and IBM RISC System/6000 systems.

• **Oracle** offers add-on features, such as triggers, snapshots and two-phase commit, that users can buy for the Oracle 7 engine.

• **Informix** offers several features similar to Oracle and Sybase, such as two-phase commit, as part of its Informix SE and OnLine databases.

• **Ingres** plans to take a Sybase-style approach with a separate replication product expected to be announced this summer and to ship before year's end.

Next leverages NextStep with access to high-speed servers

By Jean S. Bozman
SAN FRANCISCO

Next, Inc. intends to capitalize on its object-oriented software strategy with a new product that allows applications running on client machines to "borrow" objects from high-speed network servers.

The product, Portable Distributed Objects (PDO), will work with clients and servers running the NextStep operating system. But it will also shuttle objects between Next clients and Unix servers, said Brett Bachman, director of product marketing at Next.

PDO, announced at the recent Object World show here, was described as a way to allow enterprisewide applications to tap the on-line resources of multiple servers in real time.

PDO is a leading-edge technology that larger

vendors are likely to emulate, said Rikki Kirzner, principal analyst at Dataquest, Inc. in San Jose, Calif.

"It once again shows that the innovative thinking and advanced features from Next could push the industry forward," she said. "They're still a leading-edge player, but I think that the technology will be copied in one form or another."

Next Chief Executive Officer Steve Jobs has said Next is working with Hewlett-Packard Co. and Data General Corp. to get NextStep applications to scale up from the desktop to high-speed network servers. PDO-compatible products are expected from HP and Data General by year's end, according to Next.

Next, which is expected to ship PDO by year's end, is not giving out any pricing information until then.

Banyan adds tighter Novell server links

By Michele Dostert
WESTBORO, MASS.

Banyan Systems, Inc. has announced a new version of its network services for NetWare product. It will allow users of Novell, Inc.'s NetWare and Banyan's Vines local-area network operating systems to share file and print services with a single log-in.

The product, called Enterprise NetWork Services (ENS) for NetWare 1.1, provides distributed directory and security services and optional mainframe communications services to NetWare LANs. It is scheduled to ship next month.

Prices will start at $3,995 per server.

Although Banyan has aimed ENS primarily at NetWare-only environments, the new Vines/NetWare file and print capability was designed to make ENS attractive to users in mixed environments.

"We use NetWare, but the rest of the state uses Banyan; so we put in an ENS 1.0 server so we could attach files to E-mail messages and send them to Banyan users that way," said David Russo, manager of the PC information center at the Massachusetts Registry of Motor Vehicles in Boston. "With ENS 1.1, we can not only send files directly, but other state agencies can print to our high-speed network printer, generating revenue for our department."

The new release also adds support for Novell's newly released NetWare 4.0 operating system.

IS directors get Notes help from DSSI

By Michael Vizard
WESTLAKE VILLAGE, CALIF.

While Lotus Development Corp.'s Notes empowers end users by allowing them to build their own database applications, managing the proliferation and quality of those applications across an entire organization represents a substantial challenge for information systems departments.

To help solve this problem, Distributed Systems Solutions International (DSSI) has launched a set of utilities designed to allow database managers to perform control, auditing and reporting functions on Notes 3.0 databases.

Scheduled to ship this summer, the DSSI tools consist of Usage/Reporter and Replication/Reporter utilities, which produce reports of Notes database activity, and a Design/Monitor utility that tracks changes made to the design of Notes applications and database servers. The DSSI tools are priced at $995 each.

"Any company that is coming out of Notes 2.0 and moving to Notes 3.0 is looking at re-engineering and managing their Notes applications," noted Mark Fackler, director of professional services at Workgroup Productivity Corp., a Notes reseller in Oak Brook, Ill.

"People have a tendency to do business as usual. But with Version 3.0 of Notes, it's going to be more like being a database administrator," Fackler said.

While Lotus has provided dramatically improved administration tools for configuring individual databases in Notes 3.0, the DSSI tools are intended to give IS directors a global view of all the Notes databases on a network, said Stewart Bloom, DSSI vice president of marketing.

The previous lack of system administration tools has been "an impediment" in the growth of Notes, said Brownell Chalstrom, president of Chalstrom Consulting, Inc. in Oakland, Calif. "As Notes moves towards enterprisewide computing, IS departments expect the reliability they got with mainframes. Notes 3.0 fixes a lot of that for Lotus. The tools are radically improved," Chalstrom said.

"Most IS departments don't have control over the vast majority of their Notes databases, so there is an enormous duplication of data," Fackler added.

Close eye

Johnson & Higgins, Inc., a New York-based insurance brokerage firm, is evaluating the Usage/Reporter utility as part of an effort to determine which Notes databases are actually in use.
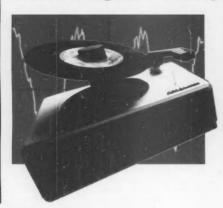
"We'd like to evaluate how much [each database is] used in order to either overhaul them or trash them," said Ed Catlett, an assistant vice president at Johnson & Higgins.
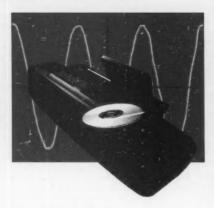
Because users can build a Notes database, the company has hundreds of them spread throughout its organization, he explained. The company does keep a tight control over which databases can be replicated to other departments, in particular, focusing on how usable the database is, whether it supports standard fields adopted by Johnson & Higgins and whether it will run on a laptop system.

In general, Fackler said, it will be particularly important for IS shops to monitor Notes databases once Lotus delivers a lookup capability for its DataLens drivers in Notes later this year. This capability will allow Notes users to access data stored in both Notes and SQL databases.

"The tools to manage Notes are definitely there, but it's like mining for gold. You have to dig for them," Fackler said.

Unixasaurus stars in Jurassic Park

By Jean S. Bozman
SAN RAFAEL, CALIF.

When Industrial Light & Magic/LucasFilm Ltd. produced the special effects for the movie *Jurassic Park*, it was Unix workstations and object-oriented software programs that helped breathe life into the sharply defined images of long-extinct dinosaurs.

Director Steven Spielberg originally planned to use robotic stand-ins for the dinosaurs of 100 million years ago. But a new generation of Unix hardware and software created convincing computer graphics, such as a herd of bi-ped dinosaurs running over hills past the film's actors. That tipped the balance toward the use of more computer animation and less use of robots, except for extreme close-ups.

Preproduction work on *Jurassic Park*, including prototyping of models, began two years ago. "None of the technology to do the picture was available when we started," said Tom Williams, executive in charge of digital production at Industrial Light & Magic. For example, he said, "We had to extend the boundaries in

terms of animation and modeling complexity to get the wrinkles in the skin, the dirt in the skin and the movement of the skin over the bones."

But a team of 14 programmers created new software tools, based on the C++ object-oriented programming language, that supported the new level of digital detail, Williams said. Then, a group of 30 animators applied those software tools to control the animation process.

Industrial Light & Magic used Silicon Graphics, Inc. workstations to make special effects for *The Abyss* and *Jurassic Park*. The firms have worked together since 1987.

Recently, Industrial Light & Magic and Silicon Graphics created a joint venture, called Joint Environment for Digital Imaging, or JEDI, that links more than 70 Silicon Graphics workstations into a high-speed computer network [CW, May 10]. It was used for *Jurassic Park* and will prototype new effects for future films.

In *Jurassic Park*, the Unix machines also had a cameo appearance in the movie, displaying three-dimensional weather maps and color-coded security systems in Jurassic Park's control center.

A new generation *of Unix hardware and software made* Jurassic Park's *dinosaurs more convincing than robots*

> "None of the technology to do the picture was available when we started," said Industrial Light & Magic's Tom Williams. "We had to extend the boundaries."

The computer room on set had an Ethernet network with 17 Silicon Graphics Iris reduced instruction set computing workstations, including 11 Indigo workstations, four Crimson workstations and two 4D/440 graphics workstations.

"We made a live network of computers, and we kept them offstage," said Michael Backes, the film's display graphics supervisor. The machines in that off-screen computer room were lent to Industrial Light & Magic from July to October 1992, Silicon Graphics said.

Kenan makes Windows push

By Michael Vizard
CAMBRIDGE, MASS.

As part of an overall effort to re-engineer its executive information and decision support software for emerging client/server environments, Kenan Technologies Corp. has unveiled a Windows version of its Acumate decision support software.

Currently available on a range of mainframe and minicomputer platforms, the Windows version of Acumate marks the company's first foray into a desktop market other than OS/2.

Acumate example usage

Acumate for Windows includes a multidimensional database packaged with an executive information system and a library of standard reports.

Data used to populate the Acumate server can be drawn from IBM's DB2, Informix Software, Inc.'s Informix, The ASK Group, Inc.'s Ingres Products Division's Ingres, Sybase, Inc.'s SQL Server, Oracle Corp.'s Oracle or Digital Equipment Corp.'s Rdb databases and then accessed using a predefined set of end-user queries.

For example, Zeneca Pharmaceuticals, a division of Zeneca, Inc. in Wilmington, Del., gives middle managers PCs and X terminals to run queries against data drawn from an Ingres database running on a VAX, without giving them the ability to change data stored in production databases.

To accomplish this, Zeneca uses a variety of VT emulation software packages on the PCs.

"The emulation software runs under Windows, but it's not a true window. You can't cut and paste across applications," said Don Hobson, technical systems manager at Zeneca Pharmaceuticals, who said the Windows version of Acumate will allow him to do that.

Kenan is also working on Release 13 of Acumate for high-end servers, which last week went into beta testing. With Release 13, information systems managers will no longer have to proactively manage Acumate databases in addition to their existing databases. Instead, Acumate will support both static and dynamic SQL links to the database, said Brian McGill, development manager at Kenan.

"You no longer have to worry about administering the Acumate database. You'll be able to set up predefined update periods where the Acumate database is populated via SQL databases using any set of predefined multidimensional formats," McGill said.

Release 13 is due this fall, McGill said.

"We've got one database that has seven dimensions to it and one database with 30 million rows. With Release 13 of Acumate, we expect to be able to use the Windows implementation as a front end to the VAX systems," Hobson said.

Acumate for Windows prices start at $4,500.

Intel announces eight products for NetWare

By Michele Dostert

Intel Corp. is evidently serious about selling more than chips. Last week, the company's networking division announced eight new local-area network storage, printing, virus protection and management products, all available now, for networks running Novell, Inc.'s NetWare v3.11 operating system.

In the network management arena, Intel's new LANDesk Manager software allows administrators to manage and take inventory of desktop hardware, configuration and software.

Administrators can view or remotely control client desktops. LAN managers can also use the product to monitor application use as well as network traffic.

Also on tap

Intel also announced two optional LANDesk add-ons: Virus Protect for scheduled or on-demand scanning of any system on the network, and SNMP Gateway, which will work with a variety of network management consoles.

Although LANDesk Manager allows easy access to Novell's NetWare administration utilities, it does not yet report into Novell's Network Management System (NMS).

"We certainly intend to work with NMS, but we're waiting for Novell to add a database to it where we can store the information LANDesk gathers," said Chris Thomas, manager of technical alliances at Intel's Networking Division.

> Intel's new LANDesk Manager software allows administrators to manage desktop hardware, configuration and software.

Choices abound

The company also announced two new LAN software packages: LANspoolExpress Print Accelerator was designed to boost printing performance on either background or dedicated workstations. And a new fax package, the NET SatisFAXtion 2.0, provides direct inward dialing support by integrating user phone numbers with their network addresses, thus automatically routing faxes to the intended recipient.

Intel also expanded its line of plug-and-play backup servers, which includes a processor, software and a tape drive.

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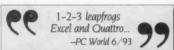
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And it's the first spreadsheet that's actually designed to help people work together in impressive new ways.

> 66 *1-2-3 leapfrogs Excel and Quattro...* 99
> –PC World 6/93

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Sail Division

1984 Sales Forecast

Sales by Region

	Bahamas	Seychelles	Bermuda	Aruba	Total
Yawls	$183	$115	$144	$158	$600
Catamarans	$130	$147	$152	$191	$620
Sloops	$131	$176	$190	$190	$687
Total	$444	$438	$486	$539	$1,907

View Sales by Region

While adding dozens of major new features, hundreds of macros and hundreds

of tools and @ functions, Lotus has actually simplified the way you work in a spreadsheet.

For example, Release 4 features an @ function pull-down menu to help you build spreadsheets faster. Cell copying is now a simple drag-and-drop operation, with meaningful visual feed-back. And changing text and font attributes is done in one dialog box. (Excel often requires three.)

So 1-2-3® is not only a lot friendlier and easier to use than any other spreadsheet, it's a significant advance over Microsoft® Excel in usability.

THE FIRST CONTEXT-SENSITIVE USER INTERFACE.

> 66 *The SmartIcons in 1-2-3 for Windows are smarter, and Lotus' approach to swapping different tool-bars in and out beats Excel's and Quattro Pro's.* 99
> –PC Computing 6/93

Release 4 actually anticipates what tools and functions you'll need. Depending on what you're doing, 1-2-3 presents only the menu choices and **SmartIcon™** palettes appropriate to the operation at hand.

This means you won't spend time clicking through menus looking for the features.

IMMEDIATE ON-SCREEN MANIPULATION.

A **Live Status Bar** on screen shows the attributes of any highlighted element.

Automatic		Arial MT	

To make a change (like font, size or decimal points) you just click on the appropriate section of the status bar. Then scroll up to your chosen attribute and click again.

And unlike Excel, 1-2-3 R 4 includes **In-Cell™ Editing**, so you can enter and edit any information right in the cell.

ONE-STEP CHARTING.

With **One-Step Charting**, you can pick up all titles, data, legends and axis labels right

LAN software

Object Design, Inc. has introduced the Object Design NetWare Loadable Module (NLM) Server, an object-oriented database for Novell, Inc. NetWare networks.

According to the company, the product was designed to simplify the development of new classes of distributed applications. NetWare users can develop applications that distribute and manage data, providing access to advanced services for imaging, multimedia, document management and groupware.

The ObjectStore NLM Server is accessible through an assortment of networking protocols, including native IPX/SPX and Transmission Control Protocol/Internet Protocol.

A developer license costs $7,500, and an end-user runtime license costs $2,250.
▶*Object Design*
One New England Executive Park
Burlington, Mass. 01803
(617) 270-9797

The Enterprise Systems Division of Apple Computer, Inc. has announced full support of Transmission Control Protocol/Internet Protocol (TCP/IP) for its Data Access Language (DAL) server software products.

According to the company, TCP/IP users can now access data on any Apple DAL-supported server from a DOS/Windows client or a Macintosh.

The DAL Server for MVS TCP/IP was also announced. Through TCP/IP, this software product provides Windows and Macintosh PCs with DAL client software access to IBM's DB2 relational database manager.

Two existing products, the DAL Server for Application System/400 and the DAL server for VAX/VMS, also received extended TCP/IP support.

Prices for the DAL Server for MVS TCP/IP range from $35,000 to $50,000, $6,000 to $12,000 for the DAL Server for VAX/VMS and $4,250 to $20,000 for the DAL Server for AS/400.
▶*Apple Computer*
20525 Mariani Ave.
Cupertino, Calif. 95014
(408) 996-1010

Cheyenne Software, Inc. has released Arcserve 5.0 for NetWare-Windows Edition.

Arcserve 5.0 is client/server backup and recovery software for single-server or large multiserver Novell, Inc. NetWare enterprises.

Enhancements include a "point-and-click" Windows interface plus an improved one-step backup command called Quick Start.

Tape cascading, parallel streaming and stacker and changer support are other features incorporated into the product.

Arcserve also provides an on-line database backup option, heterogeneous environment support, storage management services, tape rotation management and a file-tracking system, according to the company.

Pricing begins at $395.
▶*Cheyenne Software*
3 Expressway Plaza
Roslyn Heights, N.Y. 11577
(516) 484-5110

Palomar Software, Inc. has announced Version 1.1 of its On The Road software.

According to the company, the software was designed to extend seamless Macintosh PowerBook connectivity to Novell, Inc. networks.

The product provides deferred printing and automates volume remounting and print spooler selection for PowerBook users with Novell's NetWare 4.0 or v3.11 servers equipped with NetWare for Macintosh, the company said.

Version 1.1 supports NetWare 4.0, Apple Computer, Inc.'s Express Modem, the PowerBook 165C and Adobe Systems, Inc.'s PostScript Level 2 printer driver.

On The Road Version 1.1 costs $99.
▶*Palomar Software*
Suite D
2964 Oceanside Blvd.
Oceanside, Calif. 92054
(619) 721-7000

Workgroup software applications

NCR Corp. has introduced ProcessIt, a set of process management software.

ProcessIt was created to help users design, implement, execute and manage mission-critical business processes, the firm reported. To manage work flow throughout the enterprise, ProcessIt provides a suite of Windows-based tools.

An advanced database-oriented workflow engine is employed to automatically route work based on a company's policies and procedures, and ProcessIt uses graphical user interface-based tools to implement, measure and alter processes without affecting work in progress or existing applications, the company said.

A typical 30-user configuration of ProcessIt costs about $1,245 per user.
▶*NCR*
1700 S. Patterson Blvd.
Dayton, Ohio 45479
(513) 445-2078

Storage

Plasmon Data Systems has introduced Version 2.01 of the ReflectionManager, an optical-disc jukebox integration kit.

Improved network performance and compatibility with Windows 3.1 have been added to this version.

According to the company, ReflectionManager now offers substantially higher data-transfer rates and access times because of the implementation of a data caching system. Up to three single-drive jukeboxes or one single- and one double-drive jukeboxes can be integrated.

ReflectionManager prices start at $2,250.
▶*Plasmon Data Systems*
1654 Centre Point Drive
Milpitas, Calif. 95035
(408) 956-9400

MicroNet Technology has introduced the Micro/Raven 800 high-speed, 16-bit, external disk array systems for the Quadra 800.

According to the company, the disk array systems deliver up to 9.2M byte/sec. sustained data-transfer rates with average access times as fast as 4 msec. One drive of the product connects to the native Small Computer Systems Interface port of the Quadra 800, while the other drive is attached to the MicroNet NuPort III SCSI-2 host adapter.

A true parallel 16-bit data path is then created.

The systems were designed for disk-intensive applications and can be used for other applications, including file servers, full-rate digital video and computer-aided design and manufacturing.

Prices range from $4,090 to $14,490.
▶*MicroNet Technology*
20 Mason
Irvine, Calif. 92718
(714) 837-6033

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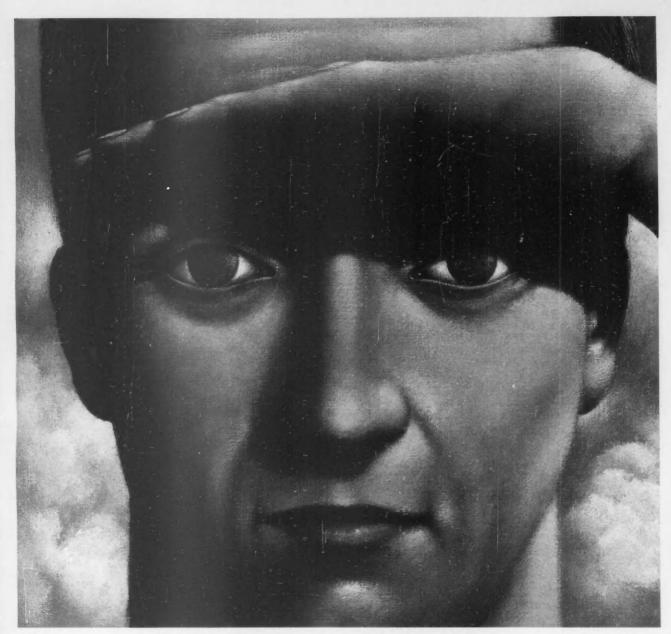
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INTERNETWORKING
SERVICES
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Enterprise Networking

AUTOMOTIVE EDI, **73**
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Internet commercial uses blossom

Videoconferencing makes use of existing infrastructure

By Joanie M. Wexler

Projects afoot to pump videoconferences across the far-reaching Internet have already begun boosting user participation in standards-setting activities, unleashing educational opportunities and fueling the "virtual" corporation.

The budding services, which deliver one- or two-way videoconferences to desktop computers, include the Internet Engineering Task Force's (IETF) Multicast Backbone (nicknamed "Mbone") and the CU-SeeMe project from Cornell University in Ithaca, N.Y.

Mbone and CU-SeeMe leverage the Internet's expansive infrastructure so millions of users can eventually participate in meetings, lectures and other activities previously off-limits because of cost and time constraints. The two services deliver video through a server at the user's site or at the regional network management center connecting the site to the Internet.

Mbone, which links to Unix workstations, is the "C-SPAN of the Internet," said David P. Grubb, manager of computing standards and technology assessment at the University of California Lawrence Livermore National Laboratory in Livermore, Calif. Grubb is "attending" IETF standards committee meetings from his desktop computer via Mbone.

Having "real users" looking over standards committee members' shoulders and detecting, for example, that the committee is putting too many functions or restrictions in a standard could accelerate getting useful products to market, observed Dan Lynch, chairman of Interop Co., a Mountain View, Calif., firm focused on heterogeneous networking.

At-a-distance participants can send electronic mail to the meeting, and committee members can take comments on-line.

Common touch

In contrast to Mbone, CU-SeeMe is more of an "everyman" service, delivering black-and-white video to Macintosh computers equipped with CU-SeeMe software. The service is running, for example, in the National Science Foundation's Global Schoolhouse Project, an endeavor to allow junior high students worldwide to communicate with each other, teachers, scientists and others.

Global Schoolhouse students in California, Tennessee, Virginia and England are already communicating.

CU-SeeMe is not based on multicast technology — a factor impeding Mbone development.

Multicast schemes allow conservation of wide-area network traffic: A sending site can
Videoconferencing, *page 73*

Service could offer small businesses access to 11,000 networks worldwide

By Gary H. Anthes
WASHINGTON, D.C.

Sprint Corp. and Microelectronics and Computer Technology Corp. (MCC) have announced a joint service for electronic commerce on the Internet.

The service consists of two layers: data transport via Sprint's Transmission Control Protocol/Internet Protocol SprintLink network service and common user services such as electronic mail, security, directory services and remittance services via MCC's Enterprise Integration Network (EINet). Users will add a third layer consisting of industry-specific applications such as electronic data interchange for retailing.

Sprint and MCC said the combined network service offers the connectivity and tools necessary to enable access to any of 11,000 networks on the global Internet to support business processes such as manufacturing and concurrent engineering. For example, a purchasing agent might use the service to look up parts in an electronic catalog of suppliers worldwide, view images of items for purchase and order and pay for them on-line.

"This ... agreement with Sprint

provides a broad distribution channel for bringing EINet to small and medium-size companies, enabling them to partner more effectively for market development," said Craig Fields, chairman and chief executive officer of MCC, the Austin, Texas-based consortium for research and development in information technology.

At a congressional hearing last year on the proposed federal National Information Infrastructure, Fields pointed out that a number of large companies — The Boeing Co., General Motors Corp., Kmart Corp., Wal-Mart Stores, Inc., Caterpillar, Inc. and Ford Motor Co. — lowered costs and improved quality by custom-building their own data superhighways linking their operations with suppliers and customers.

By providing a standard for interconnection between companies, the EINet and SprintLink combination offers the same benefits to smaller companies at a far lower cost, MCC said last week.

Electric Power Research Institute (EPRI), a consortium of 700 electric power utilities, is converting its dial-up mainframe information service to a distributed system available to members over
Service, *page 73*

European flavor

If Microsoft Corp.'s experience is a good yardstick, corporate America is embracing the Internet while corporate Europe is embracing X.400 for external messaging connections. According to Tom Evslin, general manager of the workgroup division at Microsoft, sales of gateways between Microsoft Mail and the Internet's Simple Mail Transport Protocol are "exploding" to businesses in the U.S. In Europe, the combustion is all in X.400 gateway sales.

Next step: Writing an Internet policy

As Internet use shifts beyond techies and engineers and into the corporate mainstream, information systems managers say they must create a corporatewide Internet policy to address such issues as security, privacy, directory services and pricing questions.

The first step is to decide what Internet services users need to access and limit their access to those services, Joseph Jesson, a senior analyst at Chevron Corp., said at a recent E-mail conference.

Internet options include E-mail, binary file transfer, mailing lists, "chat" sessions, news services and Telnet.

Other issues and recommendations include the following:

• **Security:** Because universities have access to the Internet, the probability of students finding an application "hole" is high. To combat this, Chevron created a "fire wall" consisting of filters and limits to Internet access. Users should also weigh the risks of certain Internet applications, such as E-mail and file transfer, against the risk of having the information in those applications exposed, Jesson said.

• **Privacy:** Good encryption can keep messages and data private, but the government wants to keep open a "trapdoor" that could

weaken encryption methods.
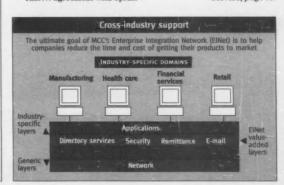
• **Reliability:** "98% reliability is fine unless it's your message that's lost," Jesson said. One option is to train people to use the Internet for informal mail and use a private, secured network for crucial traffic.

• **Storage:** Because end users have access to so much more information, such as news, data storage costs inevitably rise, said Eric Arnum, editor of the "Electronic Mail & Micro Systems" newsletter.

• **Costs:** Commercial connections vary from around $30 per month for a single-user dial-in connection to $65,000 per year for a corporate T1 connection, so managers must examine their needs and buy accordingly.

• **Cultural issues:** Internet bulletin boards are largely unmonitored, and company employees have been known to download and upload compromising and embarrassing material such as pornography. "What if Jesse Helms were going to get hold of something like this and says your company publishes porn?" Arnum asked.

• **Service:** Managers can expect a huge increase in help desk calls as mainstream corporate users, unfamiliar with Internet addressing and services, call for help, said Rob Mainor, a general manager at CompuServe, Inc. —*Lynda Radosevich*

Cross-industry support

The ultimate goal of MCC's Enterprise Integration Network (EINet) is to help companies reduce the time and cost of getting their products to market

INDUSTRY-SPECIFIC DOMAINS

Manufacturing   Health care   Financial services   Retail

Industry-specific layers

Generic layers

Applications
Directory services   Security   Remittance   E-mail

Network

EINet value-added layers

Auto repair needs EDI standards fix

By Joanie M. Wexler

The birth of auto insurance claims applications that give industry players access to a common, detailed vehicle database has generated enthusiasm for further electronic ties within the collision industry.

Sophisticated technology has emerged to ease estimating disagreements among repair shops and auto insurance carriers, which have traditionally argued for days over costs. This means customers are seeing improved turnaround time on their car repairs [CW, June 21].

However, incongruous electronic transactions have frustrated some service companies enough to form a standards consortium called the Collisions Industry Electronic Data Interchange Standards (CIEDIS) group, said Erick Bickett, CIEDIS chairman and director of information technology at Caliber Collision Centers, a nationwide repair shop franchise based in Fountain Valley, Calif.

A key goal is to preclude the need for separate computers running estimating applications designed for different platforms from multiple vendors. These vendors include Automatic Data Processing, Inc.'s (ADP) Automotive Claims Services division in San Ramon, Calif., Certified Collateral Corp. in Chicago and Mitchell International in San Diego.

ADP's system graphically depicts a vehicle's entire anatomy; Mitchell's allows adjusters to use a bar-code reader to scan parts numbers into a database, and Certified Collateral's system is text-oriented.

Aside from needing separate computers for these applications, repair shops must run an-

M.E. Cohen

other set of computers for each vendor's proprietary electronic data interchange (EDI) program and still another set for imaging applications, Bickett said. "This could feasibly total 14 computers," he noted. "We want to communicate using one machine."

"ADP's application has worked well for us for estimating," said Joe Pych, information systems team leader at The Travelers Corp. in Hartford, Conn.

However, Mitchell has come up with a total loss evaluation application, called Vista, that Travelers would like to use, he said.

"We'd like them to talk to each other. Otherwise, we'll have to rekey all our administrative data from the ADP estimating application into Vista," Mitchell said.

Setting goals

To these ends, four committees under CIEDIS' auspices have been charged with the following tasks:

• Determine business requirements and related communications needs among auto claims business partners.

• Foster standards among now disparate auto repair EDI document formats and bring proposals to the ANSI X12 EDI standards committee.

• Fuel interoperability among different auto repair estimating, management and accounting applications.

• Encourage vendors to create multiple-platform imaging systems. For example, "Insurance companies want to bring images to the mainframe, and nobody has an imaging package for the mainframe yet," Bickett explained.

The bottom line with CIEDIS: To gain the flexibility users had with manual processes. While technology has put important data at users' fingertips, what they can do with it is limited by who interoperates with what — unlike in the days of paperwork, Bickett said.

Desktop delirium

• Repair shops need standards among insurance applications to get the flexibility they had with pencil and paper

More value

The Insurance Value Added Networks Service (IVANS), a nonprofit communications network serving member companies in the insurance industry, recently signed a $1 billion contract with MCI Communications Corp. — MCI's largest to date. Video services are included, allowing a claims adjuster to remotely view and evaluate still images for damage extent, said Fenwick Lewis, IVANS vice president.

Electronic standards in the insurance industry would allow the various players to re-engineer their business relationships and hop on the "virtual corporation" bandwagon, said Paul Ramsey, The Travelers' PC claims director.

Service

MCC's EINet. Doug Moench, EPRI's project lead network engineer, said many utilities will connect their local-area networks via SprintLink.

That will allow each utility to interactively access EPRI's news services, bulletin boards, resource catalogs and documents as well as EINet directory services and many other Internet services, Moench said.

He said the utilities are also likely to use the setup for business transactions such as locating and ordering parts from a database of utility industry suppliers.

EPRI is now integrating its member services with MCC's EINet directory and security services — which Moench said were especially robust and sophisticated — plus information products from other vendors into a seamless suite of services for utilities.

"EINet already had some products in place that integrated various technologies [such as X.500 directory services] and that made it very easy to integrate our core services," Moench said.

Videoconferencing

ship just one video packet to a location wishing to download the videoconference to multiple desktops. The receiving router replicates the packet and redistributes it to the users. However, with the exception of devices from Proteon, Inc. in Westboro, Mass., routers today do not include multicast software.

Market leader Cisco Systems, Inc., upon whose products many regional Internet segments are based, expects to deliver the capability in 12 to 18 months, said Heidi Iacurto, product manager.

Meanwhile, simulating what is becoming known as the "virtual corporation," a new packet video consortium of 20 companies including Compression Labs, Inc., IBM and Sun Microsystems, Inc. is using Internet videoconferences to actually develop Internet videoconferencing technology, said John E. Drescher, manager of program development at MCNC Center for Communications in Research Triangle Park, N.C., which focuses on advanced networking research.

The consortium's aim is to put together a guideline of standard equipment and software for using Internet videoconferencing. To that end, representatives from the disparate companies are meeting via Mbone. However, efforts are being slowed by scarce multicast and Internet Protocol traffic prioritization schemes, Drescher said.

Apple adds E-mail server to open systems messaging

By James Daly
CUPERTINO, CALIF.

With the words "open systems" on the lips of many client/server system designers, Apple Computer, Inc. continued its move into this potentially lucrative environment last week with the introduction of two new versions of its MacX.400 electronic-mail server.

The MacX.400 Version 1.1 was designed for enterprise networks, while the MacX.400 SD (Single Domain) is optimized for small organizations and workgroups that need to communicate with only one X.400 server. Both will be available later this summer, Apple officials said.

Both will provide users with the ability to send messages from Macintoshes to other platforms over the Internet and to recipients on other platforms connected to X.400 networks, said Apple senior director John Nauman.

Major pipeline

E-mail has grown in importance in recent years largely because of its close ties with such things as databases and electronic data interchange. Some analysts have even predicted that messaging with E-mail will become the major communications pipeline for desktop applications in the 1990s.
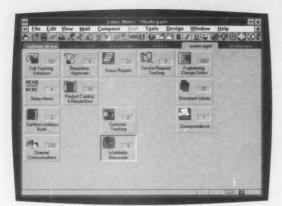
Apple's new E-mail server products also include support for Transmission Control Protocol/Internet Protocol (TCP/IP) and Open Systems Interconnect (OSI). For instance, customers can run X.400 messaging applications over the Internet using their existing TCP/IP infrastructure.

Open transport

Apple's OSI transport, OSI Connection for Macintosh Version 1.1, will include support for the ISO Transport protocol that provides end-to-end connection in multivendor environments. It will be included in MacX.400 Version 1.1 and will also be available as a stand-alone product.

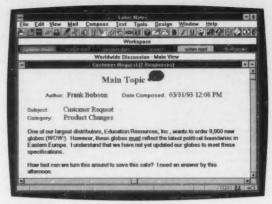Nauman said Apple will provide additional products for multivendor system-wide messaging in the future.

The MacX.400 SD has a suggested retail price of $2,950, while the MacX.400 server Version 1.1 is priced at $4,950. The stand-alone version of the OSI connection package costs $199.

1. This is James' Notes desktop. He uses it to access information and work quickly with people in all departments to solve problems worldwide. James clicks on the Worldwide Discussion application to catch up with important company news. The SmartIcons across the top make it even easier to work in Notes.
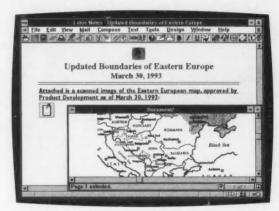
2. The field rep in Texas is working on a request from a customer. But to make the sale the product, in this case a globe, has to be changed to reflect the most up-to-date countries and borders. And evidently time is critical. The competition must already be in there pitching.

5. Once he has the information, he clicks on the Engineering Change Order application to request specific product changes from the plant in North Reading. He links the supporting Newswire information to the E.C.O. It will be easily viewed with a single click of a button.

6. After lunch he opens a document from Ellen in product development who has responded with the necessary changes and scheduling information. The new art was scanned directly through Lotus Notes' Document Imaging from the art department. James approves the art for manufacturing.

How Lotus Notes Relea

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variety of platforms. How he uses applications such as Account Tracking, Newswire, and Engineering Change Orders to get a new product developed fast. And how he creates an informal team spanning a range of departments to do it.
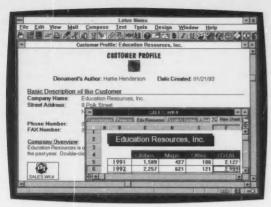
With the new Release 3, Lotus Notes now supports all the leading GUI platforms: Windows,™ OS/2; UNIX;™* even Macintosh.®

Which means the award-winning workgroup power of Lotus Notes is now readily available to help virtually all networked businesses improve

E-mail products, services multiply

Prospects for large-scale and global electronic-mail systems improved at the recent **Electronic Mail Association** conference in Atlanta as vendors demonstrated and rolled out products based on international standards for interconnecting mail networks.

The benefits of standards compliance, including interoperability and market competition, may be apparent, but at least one conference speaker voiced some reservations. In a keynote speech, Richard Miller, vice president at **General Magic**, a software developer in Mountain View, Calif., said that today's technology standards are "well meant" but "not quite there." He added that standards entrenchment could stymie creative growth.

To make his point that internationally approved standards are not always where the action is, Miller noted that the White House, which recently published an Internet address, is not in compliance with government requirements to use Open Systems Interconnect protocols, including X.400 messaging.

Meanwhile, vendors pushed ahead with partnerships and products meant to more universally integrate E-mail.

Lotus said that by the end of the year, users of the remote version of CC:Mail will be able to tap into MCI Global Messaging Services. **MCI** will operate a CC:Mail server on site that connects to MCI networks. Lotus and MCI would not reveal pricing plans.

Lotus also announced arrangements with 10 public messaging companies, including **Sprint** and European **Postal Telephone and Telegraph** authorities, to allow CC:Mail users to message one another directly across the public networks.

AT&T, MCI, Bellcore and other telecomm providers demonstrated an X.500 directory pilot project for looking up names, phone numbers and E-mail addresses by E-mail across their various services. To provide software interfaces for the demonstrations, however, the companies had to borrow applications built by academicians and available on the Internet. An AT&T employee said users should expect to be able to use X.500 services by around 1996.

Separately, **MCI** said it will begin commercially supporting the 1988 version of the X.400 protocol in December. The new services relay all X.400 message types, including Electronic Data Interchange messages conforming to the X.435 standard. MCI currently supports the 1984 X.400 standard and said that 1984 and 1988 versions will appear as a single domain to outside users.

Los Angeles-based **Isocor** introduced server software for networks of DOS-based PCs. Isocor said the software, which is based on the X.400 messaging protocol, differs from other X.400 products because it does not require a Unix or high-end PC server to run the server software.

OSIware said its Messenger 400 messaging software, which is based on the 1988 X.400 standard, will be available in August for the IBM RISC System/6000 AIX operating system. The software currently runs on many other platforms.

The **Isode Consortium**, a group of 60 vendors and end users that promotes product interoperability, released source code for the X.500 directory service and X.400 message handling services. The consortium provides members with source licenses that can be used as delivered or as the basis for products or services.

Worldtalk said it will use the X.500 protocol in its directory synchronization software and that its X.400 messaging "backbone" software now works with Lotus' CC:Mail and Microsoft's Mail client software. *— Lynda Radosevich*

Network management

Compu-Design Group, Inc. has announced LANutil Version 1.3, an Open VMS-based management and support utility package for PCs.

Support of multiple stacks for Digital Equipment Corp.'s Pathworks, Microsoft Corp.'s Windows for Workgroups, Novell, Inc.'s NetWare and OS/2 servers is provided. According to the company, LANutil offers a set of high-level utilities that operate networkwide and reference a single PC or a group of PCs.

The product can be run from any PC, VMS terminal or batch queue, and with this version, PC text files can be edited from a VAX.

A 10-PC license for LANutil 1.3 costs $150.

▶ *Compu-Design*
2nd Floor
217 West Central St.
Natick, Mass. 01760
(508) 655-1177

WAN software

BT North America, Inc. has introduced network security products and services for its Global Data Network to address the $3 billion to $5 billion annual loss in the telecommunications industry due to security breaches. The firm's Security Products Portfolio comprises four network security components: data encryption, user identification and authentication, specialized consulting services and customized security reports.

Prices vary depending on the product and service. Security Dynamics Secure ID offers a three-year contract for 1,000 to 1,500 users for approximately $7 per user per month. TCC Data Encryption costs approximately $430 to $470 per box per month.

▶ *BT North America*
2560 North First St.
San Jose, Calif. 95161
(408) 922-0250

Gateways, bridges, routers

Novell, Inc. has introduced its NetWare Multiprotocol Router (MPR) 2.1.

This version adds source-route bridging of IBM's Systems Network Architecture and NetBIOS protocols between Token Rings. According to the company, users can design more efficient, cost-effective internetworks using NetWare MPR and a single PC to perform source route bridging, routing and multiport wide-area connectivity.

The NetWare Multiprotocol Plus 2.1 was also announced. This product includes the same features as NetWare MPR 2.1 and offers the additional capability of wide-area network connectivity.

The NetWare Multiprotocol Router 2.1 costs $995, and the NetWare Multiprotocol Plus 2.1 costs $1,495.

▶ *Novell*
122 E. 1700 South
Provo, Utah 84606
(801) 429-7000

Madge Networks, Inc. has introduced Smart 16/4 Bridgenodes, a line of adapter cards designed for high-performance source-route bridging and routing with Novell, Inc.'s NetWare Multiprotocol Router (MPR) 2.1.

A software-based bridge/router solution can be implemented using MPR and Smart 16/4 Bridgenodes, which have a source-code routing Application Specific Integrated Circuit chip that supports NetWare MPR's high-speed source-routing function.

Pricing for the Smart 16/4 Bridgenodes begins at $1,045.

▶ *Madge Networks*
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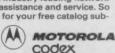
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Worldspan Travel's plan for single system takes flight

By Rosemary Cafasso
ATLANTA

Worldspan Travel Information Services shifted into high gear with its information systems overhaul earlier this month as it signed a $100 million deal with IBM for hardware, software and services.

Worldspan, which services about 11,600 travel agents worldwide and competes with such industry giants as AMR Corp.'s Sabre, plans to complete a new mainframe-based system later this year and be fully operational with it in 1994, according to George Balog, senior vice president of operations and technology.

The company, formed in 1990, is currently owned by Delta Airlines, Northwest Airlines, Trans World Airlines (TWA) and Abacus Distribution Systems Pte Ltd. in Singapore.

Since its launch, Worldspan has been working toward consolidating its travel-related services onto one system. It had been leasing computer services from its owners and providing travel information to two distinct customer bases. One customer set used the Pars reservation system, which belonged to Northwest and TWA, and the other used the Delta Datas II service.

As a result, Worldspan often did twice the work it needed to do. For instance, if airfares changed, Worldspan needed to

Worldspan's George Balog: *'Change is always traumatic'*

adjust each system separately.

Today, Worldspan is getting closer to its goal of one system. Earlier this year, it purchased the Pars Service Partnership — the data processing and network communications operation — from Northwest and TWA for $25 million. It will use that system as the foundation for its new operation and include some functionality from the Delta Datas II environment.

The IBM deal includes Enterprise System/9000 mainframes, software, storage devices, fiber-optic technology and service. IBM will work with Worldspan to develop the new core system, which will continue to be based on the IBM Transaction Processing Facility, the 26-year-old operating environment used by the airline industry.

While Worldspan considered newer technologies, including client/server, it determined that newer platforms could not provide the large-scale database management and high transaction throughput the company needs.

The Worldspan system handles up to 1,000 transactions per second on average and up to "several thousand per second" during peak vacation and travel periods, Balog said.

"I think this is really a legacy issue," said Brad Power, a consultant and vice

Worldspan Travel, *page 84*

HP fills Unix gap

Midrange systems more affordable but slower

By Mark Halper
PALO ALTO, CALIF.

■ **Since introducing the big rig of its multiuser line more than a year ago, Hewlett-Packard Co. has discovered that some users want only minivans and are unwilling to pay a half-million dollars or so for heavy equipment.**

So today, HP adds six models to its Unix line of minicomputers to fill a price/performance gap between its top-of-the-line Unix Corporate Business Servers and the remainder of the HP 9000 Series 800 Unix family.

At the same time, HP will cut prices between 10% and 30% on all entry- and midrange-level Unix minicomputers.

Base prices for the six new models range from $50,000 to $129,500 compared with a range of $335,000 to $650,000 on the Corporate Business Servers, which were introduced in May 1992 as the centerpiece of HP's mainframe alternative program.

And while the new models do not approach the performance of their more expensive brethren, users said the more appealing price tags could lead them to make upgrades they have been putting off.

At Oregon Steel Mills in Portland, Ore., for instance, system engineer Rick Kay said his company has been pushing performance limits on its HP Unix equipment for some time but has found the price tags of the Corporate Business Servers to be prohibitive.

"Now we may be able to go with one of these," he said, referring to the new models.

Another HP user, who asked not to be identified, said the Corporate Business Servers are too expensive and that HP was now offering a more reasonably priced upgrade path.

HP claims its Corporate Business Systems line — which includes the Unix Corporate Business Servers as well as versions based on HP's proprietary MPE/IX operating system with Unix hooks — has been successful.

The company said it took orders for

Unix gap, *page 86*

imagine working faster than you ever imagined.

DEC advances dates for key AXP features

By Craig Stedman

Digital Equipment Corp. is now committed to adding support for both volume shadowing and file journaling to the Alpha AXP version of its OpenVMS operating system this year, ahead of its original first-half 1994 schedule.

Both technologies are critical functions for commercial users wanting to build production systems based on the Alpha AXP hardware. Volume shadowing in particular is important to clustered machines, as it enables disk drives to be mirrored so that data will not be lost in the event of a drive failure.

"That's key for a production environment," said Matt Holdrege, senior network specialist at PacifiCare Health Systems, Inc., a Cypress, Calif., health maintenance organization that is putting in place a new VMScluster based mainly on VAX 7000s that are board-upgradable to the Alpha hardware.

While DEC already supports basic clustering in the new Version 1.5 of OpenVMS AXP, full-blown Alpha clusters will not be possible until volume shadowing is available, added Wes Melling, program director for midrange computing strategies at Gartner Group, Inc., a consulting firm in Stamford, Conn.

Delivery dates

DEC is now promising the shadowing functionality for shipment by December. The journaling capability for the company's Record Management System (RMS) file system is due out during the summer, according to a delivery schedule the company announced earlier this month.

RMS journaling records transactions and updates of other forms of data in a separate journal file that can be used to restore actual files if a system or network is disrupted. Both Alpha AXP and VAX systems will be able to access the same journaled files in mixed-architecture clusters, DEC said.

Also expected on a relatively short-term basis for OpenVMS is a Windows 3.1 user interface for system management applications. It would run on top of DEC's Pathworks local-area network software and enable users to manage OpenVMS machines from PCs.

A prototype Windows interface was shown at the recent Digital Equipment Computer Users Society (DECUS) spring conference in Atlanta, and DEC's goal "is to have something out within a year," said Donald Harbert, vice president of OpenVMS engineering.

"That's not a commitment, though, because we don't even know if we're going in the right direction on this," Harbert added. The first version would also not support the full base of system management applications now available under the company's Motif and command language interfaces, he said.

On a longer term basis, DEC is working on a new OpenVMS file system that will replace RMS. Multiple personalities will be supported, allowing it to be accessed from various non-OpenVMS operating environments, including Unix, Windows NT, Windows, DOS and Macintosh machines.

The future file system will also support much larger databases than RMS. DEC originally proposed a hundredfold increase, but users have told DEC they want to see a thousandfold improvement, Harbert said. "We're trying to get it bigger, but we're not sure how we're going to do that yet."

Nor is DEC setting out a shipment schedule for the file system at this point. "It's beyond any kind of time frame that we can talk about schedules on," Harbert said.

> ### Leaving leeway
>
> DEC continues to leave itself some wiggle room for developing a full 64-bit implementation of OpenVMS. "That's certainly our long-term goal, but we may find out that there are certain aspects that customers don't have any interest in," said Donald Harbert, vice president of OpenVMS engineering.

Worldspan Travel

president at CSC Index, Inc. in Cambridge, Mass., who worked with Worldspan when it was first launched. "If you could develop from scratch today, you would probably opt for, say, parallel processing. But with this, what they've got is a system that works."

The IBM agreement follows another $100 million deal that Worldspan signed with AT&T just three months ago. AT&T will provide a single nationwide network to link Worldspan travel agents.

When the pieces come together, Worldspan will have moved the Pars operation, now based in Kansas City, Mo., and will run one centralized system from Atlanta.

In the meantime, it is working to help customers prepare for the new platform.

The Pars users, who are more than half the Worldspan customer base, will have a less difficult migration than the Delta group. But both customer sets will face change, "which is always traumatic," Balog said.

As a result, Worldspan is keeping a focus on the migration concerns, and a team is setting up a training program that will include on-site help at a travel agency.

"We are compelled to give them the best service possible," Balog said.

Tandem vows to cut downtime

By Craig Stedman
BOSTON

Tandem Computers, Inc. plans to bring out by the end of 1994 a range of software capabilities aimed at reducing typical downtimes on its flagship Guardian fault-tolerant computers. The company hopes to diminish downtime to 10% of current levels, in part by allowing on-line system reconfigurations.

On-line reconfiguration will be provided through a new Dynamic System Configuration (DSC) package that eventually will support both IBM Systems Network Architecture (SNA) environments and non-SNA networks, said Timothy Chou, general manager of Tandem's NonStop Availability Initiative.

The DSC product will also work with local-area networks and magnetic and optical disc drives, Chou added. Also planned as part of the availability initiative are enhancements to Tandem's NonStop SQL database, Transaction Management Facility and its SNA Communications Services implementation of SNA.

Tandem's move to reduce downtime comes as rival Stratus Computer, Inc. continues to work toward a commitment to running its systems at 99.9% availability. "Within a couple years, we would expect we'll be close to that," said Jim Holley, Stratus' director of product marketing.

However, both Stratus and Tandem are still unsure of a method for extending so-called continuous or permanent availability to the application level. "That's the whole key, application availability," Holley said. "But it's a very complex topic. There's nothing which fits into a ready-made formula."

Some Tandem users agreed that applications are critical. "It's not much good to have fault-tolerant hardware and software if your application doesn't have it," noted John Nickerson, manager of computer services at Kaiser Permanente of Northern California, a Walnut Creek, Calif.-based health organization.

But both Nickerson and Michael Kelly, chief information officer at the Chicago Mercantile Exchange, said the system vendor should not be saddled with sole responsibility for the application problem. "That's probably more of a management issue" at the user level, Kelly said.

Nothing is perfect

Kelly said he was pleased that improved system recovery capabilities will be part of Tandem's plan for reducing downtime. "We've been banging away at them for five years" on that subject, he said. "I would rather have a system that has a fast recovery time than one that purports to never go down because there's no such thing."

Nickerson said Tandem is heading in the right direction. "We're happy with their products now, but as you get more and more into the realm of 24 [hour] by 7 [day] availability, any outage of any sort is significant," he said.

Richard Schreiber, president of consulting firm ATB Associates in Wellesley, Mass., said he views Tandem's biggest hurdle as "lateness to the market" brought on by shortcomings in its marketing. "They're a brilliant technology company," he said. However, "their marketing has been half-baked."

Tandem's new products will require the Posix-compliant version of the Guardian operating system due out later this year, Chou said. The firm's Integrity line of Unix systems is not targeted for the work now under way, he added.

> ## Disproportionate impact
>
> While mean times between major system failures are on the rise, Tandem views "transient," or minor, failures as a problem that is not going away. Those account for 80% to 85% of all failures and can cause system outages out of proportion to their severity by corrupting databases.

Unix platforms host Bull DPS 6 apps

By Craig Stedman
BILLERICA, MASS.

Groupe Bull has introduced emulation software said to enable applications written for the company's proprietary GCOS 6 operating system to run on its IBM RISC System/6000-based DPX/20 Unix hardware, albeit with a significant impact on application performance.
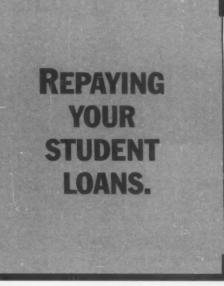
Maurice Gervais, Groupe Bull vice president of North American/Pacific products and services, said applications would run at "a ratio of 1-to-3 or 1-to-4" under the new GCOS 6 HVX software for the DPX/20, as compared with the native performance on the company's DPS 6 and 6000 small systems.

However, with development of the DPS 6 and 6000 processors stopped, Gervais said the emulator provides a growth path for users of those machines.

The initial version of GCOS 6 HVX, due in September for the full DPX/20 line, will run uniprocessor GCOS 6 applications as is, Gervais said. Support for multiprocessor applications is expected to follow in the second half of 1994.

A midrange DPX/20 Model 460 with HVS and support for 32 users costs $53,361, plus $5,630 for annual maintenance.

Groupe Bull also expanded its DPX/20 line with the Model 130 compact desktop server and the Model 630 deskside server, priced from $5,445 and $27,450, respectively. The firm is also building support for the Windows NT operating system and Windows Open Services Architecture into its Distributed Computing Model for multivendor applications.

Intelligent expert systems

Legent recasts help desk server plans

By Gary H. Anthes
PHOENIX

Legent Corp. has scrapped its original concept for a help desk product — a rules-based "expert system" shown as a prototype at its annual user conference more than a year ago — in favor of one that will in essence build its own intelligence based on experience.

Chief Technology Officer Robert Yellin told customers at Legent's user conference here last month that the company had made the wrong choice between two approaches to automating problem diagnoses in distributed systems.

"Our idea was if we could just get a really smart person to code up the rules as to how to diagnose a problem, we could systematically diagnose [problems] by going through that knowledge base," Yellin said.

The idea for Legent's "Professional Help Desk Adviser" did not pan out, Yellin said, because of the difficulty of finding experts who had the required knowledge and could communicate with "knowledge engineers" building the system.

Probing deeper

Now Legent is working on a product that will be driven by a database of actual configurations and "events" — captured by electronic probes — that are digested in a process called "intersection analysis."

"You look for things in common — for patterns, for interrelationships among things that existed in every instance of a problem," Yellin explained. "You do a lot of matching, a lot of permutations and combinations."

Yellin said the approach is an example of case-based reasoning,

and he jokingly said he hopes to name the product Deja Vu.

He said the resulting "help desk server" will become "the epicenter" of the data center. "Most of your staff growth in the 1990s will occur around the help desk because the situation out there is so complex," he told data center professionals at the user conference.

"We see fewer traditional operators and more systems managers," said a Legent customer at the conference who asked not to be named. "And the systems managers need a help desk environment more than a console operator environment. Legent will be consolidating a lot of information, but in order for someone to troubleshoot in a distributed environment, you're going to need that gamut of information."

The help desk server will be connected to an array of other specialized servers, Yellin said, for functions such as user administration, archiving, software distribution, application management, performance management and scheduling.

For example, the distribution server will automatically send software updates to users, and the results will be sent back to the schedule server and the help desk server. "We'll need some very sophisticated probes out in the network," Yellin said.

And the data captured by the

probes will have to be very detailed. If a PC user calls the help desk with a problem, the help desk technician will want to see a click-by-click record of everything that user did for some time leading up to the problem, Yellin said.

In addition to the help desk server, Legent is developing a server for distributed backup and recovery.

Using pattern recognition techniques for which Legent is seeking patents, the backup server will avoid duplication by recognizing a piece of software or data that it has already backed up. When this happens, all it has to do is log in a directory the identity of the item to be backed up and its source.

The scheme is intended to save storage space and reduce network traffic. For example, if the distribution server sends out thousands of copies of new PC software from a mainframe to departmental servers and from there to desktops, the backup and recovery server will recognize that it is getting the same thing back multiple times when individual end users run their incremental backups the next day. Only one copy will be saved.

The product will create diskettes for each server. When a server goes down, its diskette can be carried to a server elsewhere, where it will drive the recovery process, automatically going wherever necessary on the network to get the information needed for recovery.

"If it really does the job correctly and efficiently, it will be an amazing success," said Pete Clark, systems programming manager at Olan Mills, Inc. in Chattanooga, Tenn. "Anything that will allow me to ensure that I have an archived copy of the most pertinent data is going to be very attractive."

Syncsort software simplifies mainframe-to-Unix migration

By Jean S. Bozman
WOODCLIFF LAKE, N.J.

Users who installed beta-test versions of Syncsort, Inc.'s Unix software in recent months said it eased the migration of mainframe applications to Unix workstations. Syncsort, which has been selling its data-sort software to mainframe shops for 20 years, said it recently began shipping production copies of a Unix version.

Large volumes of data — ranging from several gigabytes up to 300G bytes or more — may require presorting for use with some downsized Unix applications, users said. That is because the smaller Unix system sometimes cannot handle the sheer volume of transactional data held in mainframe flat-file records.

Syncsort software was traditionally applied to batch-processing jobs that ran against large volumes of flat-file data, the users said.

AT&T has millions of records to process for some internal consumer marketing applications, said Ivan Hungria, a senior software engineer in AT&T's Consumer Communications Services Department in Basking Ridge, N.J. "We handle so much data that we cannot put it all into one database," Hungria said.

The AT&T site had used Syncsort on mainframes for four years. But in recent months, the customer billing application was moved to a Sun Microsystems, Inc. server with the data stored in local flat files.

Triple the throughput

Now that the AT&T data is sorted on the Unix server, the application's throughput is three times faster, Hungria said. "It was very uncomfortable to ship the data up to the mainframe for sorting and then ship it back to the Sun system," he said. The Syncsort software, installed two months ago, was priced at about $7,000 for the Sun server — roughly half its mainframe price, he said.

Paul Zyla, a programmer/analyst at the National Marrow Donor Program in Minneapolis, said Syncsort's Unix sorting software has cut end-of-month processing time in half — from two days to less than one. The program, which matches donors and recipients for bone marrow transplants, has Sybase, Inc. relational databases running on its Sun SPARCstation 10 and Sun 630 Unix servers. It uses the new Unix package to sort database extracts for about 80 end-of-month reports, Zyla said.

The Unix version of Syncsort ranges in price from $1,000 for a single-user workstation to $25,000 for a large Unix server, the company said. The Unix version is available for Sun's Solaris, Hewlett-Packard Co.'s HP/UX and IBM's AIX for RISC System/6000s.

Beta-test users said they received their Unix software last winter and installed a production copy in April.

> Now that the AT&T data is sorted on the Unix server, the application's throughput is three times faster.

HP fills Unix gap

200 of them by the end of last year; it has not provided updated numbers. The line was initially troubled by shipment delays.

Last week's additions include three dual-symmetrical multiprocessor machines and three uniprocessors. All six use a 96-MHz version of HP's Precision Architecture-RISC 7100 microprocessor.

The three new multiprocessor models stretch the upper ranges of the middle of HP's Unix minicomputer line by weighing in on the Transaction Performance Processing Council's TPC-A benchmark at 411 trans./sec. running an Oracle Corp. database.

HP claimed the new models outperform systems from Digital Equipment Corp., Sun Microsystems, Inc. and IBM in price/performance. It said benchmark tests showed that one of the dual-processor models, the H70, beats eight-processor systems from Sun and NCR Corp.

HP estimated TPC-A ratings for the three new uniprocessors at 280 trans./sec., said Carol Mills, general manager of HP's General Systems Division, the company's Unix minicomputer operation. That testing is not yet complete, she said.

By comparison, the remainder of the Unix line ranges from an estimated 50 trans./sec. running Oracle to 193 trans./sec. running Oracle, Mills said. Corporate business servers are rated at 710 trans./sec.

The six new models follow a nomencla-

ture HP implemented last December, when it began labeling each machine in the Unix line with a letter corresponding to its number of I/O slots [CW, Dec. 14, 1992].

The uniprocessor G60, H60 and I60 have four, eight and 12 I/O slots, respectively, as do the dual-processor G70, H70 and I70 boxes. The G models come standard with 32M bytes of memory and 500M bytes of storage. The H and I models have 64M bytes of memory; the H models have 1G byte of storage, and the I models have 4G bytes.

Software application packages

Applicon, Inc. has announced Bravo Version 4 Plus, mechanical design software.

Enhancements and features for the product include Dynamic Modeling; Open Software Foundation's Motif-consistent user interfaces; the ability to send information across various operating systems, including Unix and VMS, seamlessly within the Digital Equipment Corp. environment; and manufacturing applications that include improved tool path animation.

Version 4 Plus also offers a new Variable Declaration Panel designed to make it simpler to create and manage variables that drive designs. It includes 13 hot keys created for keystroke shortcuts that enable users to execute command strings, according to the company.

Applicon's database management application, BravoFrame, now supports Ingres, the Ingres Product Division of Ask Computer Systems, Inc.'s relational database management system.

BravoEdit, BravoConvert, BravoReview and BravoHarness are four new applications that are available with Bravo Version 4 Plus.

Pricing begins at $7,500 per seat.
▶ *Applicon*

4251 Plymouth Road
Ann Arbor, Mich. 48106
(313) 995-6000

Generic Software, Inc. has announced Release 4 of DeskWorks for IBM's Application System/400.

According to the company, DeskWorks is a comprehensive spreadsheet system that offers more than 30 new features and enhancements. Instead of entering cell addresses, a new point mode allows cells and ranges of cells to be chosen by using the spreadsheet cursor movement keys.

Graphic charts can now be displayed on printers, plotters and graphics-capable workstations with a Quick Chart feature.

The results of an AS/400 database file query are returned with a new query function, and performance improvements such as faster spreadsheet calculation, column/row insert, deleting, sorting and printing have been added.

DeskWorks is available for a onetime license fee of $695.
▶ *Generic Software*
986 Madison Ave.
Madison, Miss. 39110
(601) 853-1189

Utilities

MB Solutions, Inc. has introduced the JCL/Cross-reference, a product that automatically provides MVS users with complete documentation of production job control language (JCL).

Additional storage requirements, programming and data entry are not needed. The product supports Version 4.2 of MVS/ESA.

According to the company, numerous expanded JCL functions and facilities to MVS JCL are added with MVS/ESA Version 4.2, including Nested Procedures, Set, Include and JCL Lib statements. All of these expanded capabilities are supported by the JCL/Cross-reference.

Prices start at $5,500 for MVS systems.
▶ *MB Solutions*
Suite 106
1720 S. Bellaire St.
Denver, Colo. 80222
(303) 782-0178

Compuware Corp. has announced Xpediter/TSO and IMS Release 5.3.

A direct connection to Compuware's fault-diagnostic tool MVS Abend-Aid is also included.

According to the company, the product gives users interactive control over program execution at the source level for diagnosing and fixing programming errors.

Xpediter/TSO and IMS users will have access to extensive diagnostic information provided by the link to MVS Abend-Aid.

The Xpediter/TSO and IMS 5.3 operate under MVS, MVS/ESA and MVS/XA with prices ranging from $33,000 to $89,000, depending on CPU size.
▶ *Compuware*
31440 Northwestern Highway
Farmington Hills, Mich. 48333
(313) 737-7300

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TOOLS

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Application Development

Software AG aids rightsizing

By Gary H. Anthes
RESTON, VA.

■ **Software AG of North America, Inc. last week unveiled an array of professional services for customers and prospects befuddled by downsizing, rightsizing, client/server, distributed computing and related ventures outside the glass house.**

Called Spirit — for Strategic Programs for Implementation of Rightsized Information Technology — the initiative moves Software AG more into the world of consulting and orients its sales and customer service efforts more toward the planning and analysis that precede the procurement, development or porting of an application.

"The image that customers have had of us is more technical than we would like it to be," said Jonathan Church, director of central services.

Spirit has the following components:

▶Rightsizing Analysis and Technical Evaluation (Rate) is a consulting service to help users understand the basics of rightsizing, inventory their systems assets with a view toward possible rightsizing and map out a tactical and strategic rightsizing plan.

▶Rightsizing Applications Methodology Program (Ramp) is an eight- to 10-week session of on-site technical and management support that extends Rate to a more detailed level. A small prototype application is delivered at the completion of the effort, which typically will cost between $50,000 and $85,000.

▶Rightsized Environment Achievement (Reach) is a fixed-price, turnkey development of a distributed system.

▶Rightsizing Center is a place users can go to get hands-on experience with major platforms for distributed computing, with Unix and OS/2 boxes and connectivity tools from Hewlett-Packard Co., Sun Microsystems, Inc., NCR Corp., AST Research, Inc., NEC Technologies, Inc. and Digital Equipment Corp.

When used for converting applications from mainframe to distributed environments, use of the center will cost between $1,500 and $2,500 per day.

"Spirit is a good structured way for IBM mainframe shops to take an evolutionary approach to rightsizing their hardware and applications," said John Logan, executive vice president at Aberdeen Group in Boston.

"Except for IBM, they are the only ones to have done this from the mainframe perspective," Logan said. "If you asked Oracle to come into the data center and tell you which applications should be downsized, with what tools and in an evolutionary way, they wouldn't have the slightest idea where to begin except to say, 'Obliterate the mainframe.' If you're a mainframe-trained veteran, this is a great chance to open your eyes to see what the opportunities are, a try-it-before-you-buy-it approach from someone that knows your business and is constructively helping you adjust to the change."

Seer, IBM reveal plans for AD/Cycle technology sharing

By Thomas Hoffman
NEW YORK

IBM Programming Systems tried to pump new life into its AD/Cycle software development program recently when it announced plans to incorporate Seer Technologies, Inc.'s communications connectivity code into future application generator products.

Under the shared technology agreement, Seer plans to embed IBM's Cross System Product 4.1 application generator into Seer's High Productivity System (HPS) application development suite. The deal is expected to further strengthen IBM's object-oriented programming strategy by adding reusable code that can be transferred between IBM and non-IBM platforms, analysts said.

In addition, Seer's middleware components will be bundled into IBM's future AD/Platform products, IBM officials said. AD/Platform, a follow-on to the AD/Cycle program, is expected to comprise a repository-based development environment geared toward local-area network and cross-platform connectivity.

James Archer, director of AD/Cycle for IBM's Programming Systems unit, said AD/Platform products containing the Seer run-time elements will ship by mid-1994. A Programming Systems spokeswoman said the unit will introduce client/server software beginning this fall.

The deal was also seen as a shot in the arm for Cary, N.C.-based Seer, a 3-year-old, $35 million spin-off of The First Boston Corp., whose computer-aided software engineering

(CASE) products have gained widespread acceptance by a bevy of Fortune 500 companies. The joint marketing and technology-sharing agreements, which were made here at Seer's Third Annual Customer Council, significantly expand Seer's global reach through IBM's massive sales force. Plus, Seer will receive royalties for the HPS components that will be bundled into IBM's products. IBM purchased a 40% equity stake in Seer in 1990.

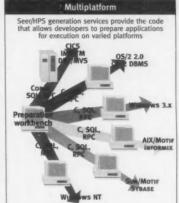The Seer connectivity software allows users to combine IBM's Systems Network Architecture, CICS and DB2 environments with emerging open systems standards such as Transmission Control Protocol/Internet Protocol and Open Systems Interconnect. The connectivity software would also allow IBM to share its application development data distribution between IBM and non-IBM platforms.

The Seer connectivity software layer will now permit IBM's MVS CICS, MVS IMS, OS/2 and AIX environments to interoperate with Microsoft Corp.'s DOS, Windows and Windows NT, as well as Sun Microsystems, Inc.'s SunOS and Solaris, which Seer's HPS supports.

"What it gives IBM is the ability to generate code to non-IBM platforms," noted Gene Forte, president of CASE Outlook, a Portland, Ore.-based CASE research firm that publishes a bimonthly newsletter by the same name.

Forte said the shared technology deal accelerates IBM's plans to implement reusable code for its application development domain. Reusable code, Forte said, is one of the

Source: Seer Technologies, Inc.

Seer users eye redevelopment strategies

A handful of the nearly 500 users who recently jammed Seer's Third Annual Customer Council discussed their plans involving Seer's HPS CASE development environment.

Although project plans varied from one site to another, one common theme appeared: Most of the conference attendees have made plans to redesign or redevelop legacy systems to run on distributed architectures, with HPS acting as the enabler.

"We're looking to redevelop 80% of our systems," said Robyn A. Turk, a senior vice president of operations and systems at PaineWebber, Inc. in Weehawken, N.J. Turk said the brokerage firm plans to shift the bulk of its centralized processing, such as trade bookings, to distributed workstation environments. Meanwhile, the mainframe will be kept to clear trades with stock exchanges and may eventually take on a new role as a large corporate server.

PaineWebber has been using Seer's HPS CASE tools during the past 18 months for workstation application development. The first project is the development of a new customer database that is slated to go on-line by mid-1994. Turk said PaineWebber chose HPS primarily because its upper- and lower-CASE tools are fully integrated.

"When you're rewriting 8 million lines of code, you need a tool to collate the information. From that perspective, HPS integrates everyone together, allowing us all to speak the same language," Turk said.

Charles Schwab & Co. has used HPS Version 3X for the past two years to redevelop three production systems: a mutual funds maintenance system, a customer prospect system and a margins system. All three systems now run on Intel Corp. PC architecture workstations that are cooperatively linked to a Hitachi Data Systems Corp. AS/EX-520 mainframe, according to Jim Stinton, director at the information systems division of the San Francisco-based

Seer users eye redevelopment

brokerage company.

But Schwab's cooperative processing scheme will not last much longer. When the brokerage upgrades to HPS Version 5.3 later this year, Stinton said, Unix servers will be brought in to route information throughout its trading environment.

"We need distributed computing so we don't get blown out of the water if one of our databases goes down since we have to continue trading," Stinton said. Although Schwab plans to retain its HDS mainframe to run its core trading system, Stinton said, the company is planning to offload other applications, such as its accounts payable or accounts receivable systems, onto a Unix platform in the future.

Stinton said he expects Schwab to decide on a server platform by the fourth quarter. The company has already decided to install 4,000 Sun Unix workstations

AD/Cycle plans

major cornerstones supporting IBM's AD/Platform strategy.

Still, the Seer/IBM alliance raises questions about the status of CASE AD/Cycle partners such as Sapiens International Corp. and KnowledgeWare, Inc. "When the AD/Cycle alliance first came out, KnowledgeWare was the favorite son. Seer is now being promoted almost in its place," said Peggy A. Ledvina, a program director for application development strategies at Meta Group, Inc. in Westport, Conn.

Meanwhile, the Seer customers and conference attendees seemed more interested in the planned enhancements for HPS than in the IBM AD/Cycle alliance (see story page 91). "DCE and DME compliance is more relevant to us than AD/Cycle," said Donna Maria Krasner, a manager of technical services at Chesebrough-Ponds USA in Trumbull, Conn.

The next generation of HPS, Version 5.3, will include a distributed computing environment option for multiple transaction management.

HPS 5.3 is currently in beta testing and will begin shipping by the first quarter of 1994, according to Vivek Wadhwa, vice president and chief technology officer at Seer.

Teamwork

Seer and Transarc, Inc. also announced a joint program to market the combined technologies of Seer's HPS CASE environment with Transarc's Encina on-line transaction processing products, which were designed to coordinate the updating of distributed databases.

during the next three years as part of the distributed trading environment.

Donna Maria Krasner, a manager of technical services at Chesebrough-Ponds USA in Trumbull, Conn., attended the conference on behalf of Unilever PLC, British parent of the health care product manufacturer. Unilever's Personal Products division, which includes Chesebrough-Ponds, Elizabeth Arden Co. and Calvin Klein, Inc., is planning to select either one standard application development environment or "the best of breed" features from several environments by the end of this year, Krasner said.

Krasner worked in IS from 1988 to 1990 at The First Boston Corp., where HPS was created before Seer was spun off into a separate company. Her experience with the CASE environment — and Seer's commitment to the Open Software Foundation's OSF/1 and Distributed Computing Environment standards— spark Krasner's interest in the application development tools.

"Anything that helps us get past the barriers of conflicting hardware and software environments and leads us to a more open environment is of interest to us," Krasner said.

— *Thomas Hoffman*

NCR to supply development tool suite

By Melinda-Carol Ballou

NCR Corp. demonstrated its Application Development Environment (ADE) at the recent Object World show in San Francisco, showing a suite of object-oriented tools for development of client/server applications.

Partners who joined with NCR in providing tools for ADE included Lucid, Inc., Object Design and AT&T Bell Laboratories, Inc.

ADE includes the C/C++ Workbench, an object-oriented programming system for Unix that helps users make the transition to writing C++ code by using familiar programming tools, company officials said. C/C++ Workbench was jointly developed by Lucid and NCR. C Workbench and Cobol Workbench enable programmers to develop applications procedurally in C or Cobol. Both were developed by NCR.

Also included in ADE are nmake, a Unix tool that allows customers to construct, maintain and manage software and documentation; and Sablime, a product administration system that lets managers and developers track changes to software, hardware and documentation. AT&T Bell Labs contributed these tools to ADE.

In addition, ADE will include software development kits that support NCR's Top End transaction management system.

ADE will be available in the third quarter. The C/C++ Workbench will be priced at $3,000 per seat; C Workbench will be priced at $1,500 per seat; and Cobol Workbench will be priced at $1,800 per seat.

Sablime and nmake will be priced at $500, and the software development kit for Top End will be priced at $800.

In Brief

Help for ISVs
Uniface Corp. announced a technology transfer program that enables independent software vendors to provide interfaces among their products and the Uniface fourth-generation language tools, databases, networks and utilities. Dubbed "Fusion," the new program offers interface "cookbooks" with templates provided by Uniface and an extensive support program. Participating companies include Cincom Systems, Inc., Information Dimensions, Inc., VMark Software, Inc. and Richard Irwin Associates.

Firm develops Mumps
InterSystems, Inc., vendor of Mumps products, including a database dubbed Open M/SQL, will participate in IBM's Marketing Development Program with five other companies. IBM will use InterSystems' M/SQL to facilitate migration of Mumps users from proprietary environments to IBM's RISC System/6000 series of Unix workstations, IBM officials said.

Application development tools

Softwarehouse Corp. has announced Network Program-to-Program Communications (NPPC) for Windows.

The product is a Windows-based version of the company's library that is used for developing network applications.

According to the company, NPPC for Windows was designed for users who are creating Windows 3.1 or Windows for Workgroups network applications in C or C++. Available for IPX and NetBIOS networks, the product provides the same application programming interface for both versions.

Either library (NPPC for Windows/IPX or NPPC for Windows/NetBIOS) is available for $195 or $395 with source code. Both libraries (NPPC for Windows/IPX and NPPC for Windows/NetBIOS) can be purchased together for $329 or $729 with source code.

▶ *Softwarehouse*
326 State St.
Los Altos, Calif. 94022
(415) 949-0203

Extrasensory Software has announced Version 2.0 of both PS Error and Sez You, two products for the company's CA-Clipper development tools.

PS Error is a replacement error system, and Sez You is an environment control utility.

PS Error tracks both runtime errors and fatal errors, the company reported. Features for the product include reduced memory overhead, specialized runtime interfaces and CA-Clipper 5.2 compatibility.

Sez You offers new functions to report important machine information, result codes that inform users of problems, a simple evaluation order for configuration settings and CA-Clipper 5.2 compatibility.

PS Error 2.0 and Sez You 2.0 each cost $149.95.

▶ *Extrasensory Software*
Suite 8
4450 Murietta Ave.
Sherman Oaks, Calif. 91423
(818) 981-8367

XDB Systems, Inc. has released XDB-QMT Version 3.0, a product that allows users to develop and test QMF-compatible queries, reports and procedures in the desktop computing environment.

Designed to operate with XDB, DB2 and mainframe DB2 databases, XDB-QMT 3.0 is a PC-based data query, retrieval and reporting facility.

Version 3.0 offers configurable user interfaces, including a QMF-screen mode that lets users work with the same command syntax provided in mainframe QMF.

The product uses the company's Common Windowing Interface, providing features such as pull-down menus, scrollable windows, push buttons and mouse support.

XDB-QMT 3.0 also interfaces with IBM's OS/2 REXX language and requires an IBM PC/AT or a Personal System/2 compatible running DOS or OS/2.

XDB-QMT Version 3.0 costs $1,200.

▶ *XDB Systems*
14700 Sweitzer Lane
Laurel, Md. 20707
(301) 317-6800

Gpf Systems, Inc. has started shipping Version 2.1 of the GUI Programming Facility (Gpf), an OS/2-based interactive point-and-click development tool designed for developing graphical user interfaces.

From a single design, this version is said to generate native IBM OS/2 2.1 Presentation Manager WorkPlace Shell and Windows 3.1 interface code, while maintaining a common look and feel across both platforms.

According to the company, Gpf 2.1 automatically generates Dynamic Link Libraries and supports C and C++ compilers.

Gpf 2.1 runs on OS/2 Versions 2.0 or higher and requires a mouse and at least 6M bytes of available hard disk. Six megabytes of random-access memory are recommended.

A single copy of Gpf Version 2.1 costs $1,295.

▶ *Gpf Systems*
30 Falls Road
Moodus, Conn. 06469
(203) 873-3300

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TIES that BIND

Mobile technologies are luring your workers onto the road by the thousands. It's your job to help them survive in "the virtual corporation."

The Pacific Stock Exchange's Dave Eisenlohr: *'How do you manage people you never see? Communicate, communicate, communicate.'*

By Joanie M. Wexler

A feather-light notebook PC here, a high-speed network there.

Sooner than you might think, the avant-garde work style known as the "virtual corporation" will have invaded American businesses right under our noses, thanks to new technologies that physically untether employees from organizations and let them work wherever they can be most productive.

Advocates of the fledgling concept, popularized by consultant William Davidow last year, say "virtual" businesses can save money on office space, put employees on the front lines and offer flexible work environments to valued personnel. But experts caution there are drawbacks, too.

For starters, business and information systems managers alike need to plan for culture shock caused by quieter corridors, as well as the prospect of employee burnout resulting from round-the-clock electronic access.

Then there's the added burden of creating and supporting a far-flung technology infra-

vir·tu·al cor·po·ra·tion:

1. AN ASSOCIATION OF EMPLOYERS AND EMPLOYEES NOT UNITED AT ALL TIMES BY A PHYSICAL WORK ENVIRONMENT.

2. AN ASSOCIATION OF DIFFERENT COMPANIES ABLE TO COME TOGETHER TEMPORARILY THROUGH BENEFIT OF COMMUNICATIONS TECHNOLOGY TO ACHIEVE A COMMON MISSION.

structure.

Lest you think the whole notion is hooey, consider several recent studies that suggest "virtual technology" use is exploding. A recent study from The Yankee Group, for example, notes that the number of cellular network subscribers (voice and data) is expected to nearly double by 1996, to 22 million.

But many observers say most organizations and managers are poorly prepared to handle the challenges a virtual corporation will create.

A recent report from London-based researcher Ovum Ltd. found only 325,000 mobile data subscribers in North America and Europe. The reason? Companies have been slow to im-

Mobile ties that bind

plement the technology because of its major technical and organizational impact.

Despite such lethargy, smart managers will learn to keep abreast of bewildering changes. The best way, according to consultants and IS managers on the virtual path, is to keep in close touch with scattered employees and know when to call them back.

"Successful managers will know how to differentiate when it is appropriate to use technology [to share resources or communicate] and when a face-to-face meeting is called for," says Barton Goldenberg, president of Information Systems Marketing, Inc. The Washington, D.C., consulting firm specializes in mobile computing applications.

Such managers, Goldenberg notes, "will roll with the punches

computer operations at the Pacific Stock Exchange, now in the early design stages of a virtual office.

"That is the heart and soul behind success stories of the virtual office," he adds.

An excellent way to create processes to make the virtual workplace work is to send the boss out for a trial run, says Andy Seybold, an industry analyst and publisher of the "Outlook on Computing" newsletter. He says, "When people ask me how to prepare their staffs for the virtual workplace, I tell them to get on a plane for a week and run their offices remotely."

Keep talking

Raymond Perry, vice president and chief information officer at Avon Products, Inc., agrees that good communication is vital. With a worldwide staff of 1.7 million mo-

Avon's Raymond Perry: *People need to share experiences, so face-to-face meetings are vital*

JOYCE RAVID

Mobile pros: 1997

THE COMBINATION OF CELLULAR, PC, PAGING AND COMPUTING TECHNOLOGY WILL SPAWN A NEW BREED — MOBILE PROFESSIONALS — WHO WILL BEHAVE IN NEW WAYS AND CREATE MULTIBILLION-DOLLAR MARKETS

- SALES — 23%
- FIELD SERVICE — 18%
- ADMINISTRATION — 15%
- FIELD ENGINEER — 10%
- SENIOR MANAGEMENT — 8%
- OTHER — 26%

in responding quickly to electronic needs." Managers who can't cope with a feeling of losing control over unseen employees, he adds, are heading for trouble. "They will be recycled into a different function," Goldenberg predicts.

Indeed, others agree that it will take a savvy manager to cook up mobile business practices as effective as a water cooler chat or a spontaneous reward lunch.

Experts say IS managers can get a big leg up by starting now to teach their staffers how to communicate in ways more in sync with a wall-less organization.

"We're talking about reorienting the user with a whole new skill set. How do you manage people you never see? Communicate, communicate, communicate," says David Eisenlohr, vice president of telecommunications and

bile salespeople, the New York-based beauty products maker exemplifies what the typical virtual organization of the future may look like.

"The motivation of people is emotional," Perry says, "[so] we have to get together every couple of weeks in person because people support each other and share experiences. You can't do that over the phone or with a conference call."

To keep up the face-to-face contact, each Avon district manager holds regular sales meetings. There, representatives are shown new products and learn about incentives, Perry explains. The company also keeps regional people current by daily updating sales data to each district.

"We download meaningful information about a district manager's

business, such as sales performance data in her territory, every night to her home to jump-start her each morning," Perry explains.

At systems integrator and management company NMI, Inc. in Fairfax, Va., many employees telecommute from home, Chairman F. A. Dramis says. To maintain employee/organization ties, core teams meet for one hour every Monday on a conference call and talk about their two most important projects.

Then, says Dramis, a former CIO at Salomon Brothers, Inc., "we tape the conversation and put it on our voice-mail system so any employee can call in and find out the 50 most important things going on in the company."

His secret to making the new approach work? Make a list of things you did in the nonvirtual office, then replicate them with technology. The trick is to "make into formal processes what was once informal," he says.

Virtual burden

The virtual corporation presents IS managers, in particular, with another challenge. Besides the stress caused by virtual employees, there's the additional burden of researching, purchasing, installing and maintaining the technology that will support the communications needs of wandering workers.

For example, Dramis notes that distributed computing technology lets processing and storage be located anywhere in the environment. "It's up to IS to create virtual access to these resources and a virtual computing process to link people together," he says. "IS has to create the virtual data center to match the virtual corporation."

Such access could mean matching applications to appropriate remote networking technologies or outfitting users with portable PCs

or pagers containing interfaces to cellular or packet data wireless networks, Dramis explains.

And because stationary users are accustomed to near-instant network response times, corporate IS is faced with the challenge of providing users with services as close as possible to those they can get in the office.

"Basically, you have to be able to give users a mirror image of what they get on their local-area networks" at headquarters, says Phillip Evans, director of telecommunications at Perot Systems Corp., which is also constructing a virtual environment.

That's an especially big challenge because of the relative speed limitations of today's wide-area bandwidth, especially in wireless.

And Eisenlohr also notes that building a virtual computing infrastructure includes educating end users to be more effective at troubleshooting technical problems for themselves.

"It's downright expensive to have support resources at a facility sitting idle while your sales force is out in the field 80% of the time," he observes.

The spy within

Even presuming you can patch together a cohesive infrastructure, experts say your problems are only beginning.

What happens, for instance, when workers and bosses are in 24-hour contact via an electronic link? Intrusion by management, some workers fear.

Mark Lowenstein, a Yankee Group analyst, noted at a recent mobile computing conference that such concerns will inevitably grow. "We're entering the era of the 'no excuses' professional, who will have less guilt-free leisure time," he predicts.

To sidestep this hurdle, Goldenberg advocates a "three-times" policy that reassures users — particularly commission-driven salespeople — that they stand to gain much more than they lose in the virtual corporation.

The idea is simple, Goldenberg explains: "For every piece of information you request from users, give them three back." This ultimately will help them be more successful at their jobs, he says. "For example, give them six pieces of information for one call report that gets shot out to marketing and customer service," he says. ∎

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Calendar

CEO vision

Renato DiPentima, the top information systems executive at the Social Security Administration, is fed up with chief executive officers who get too involved in techno-decisions and toss around terms such as Unix, Application System/400 and Ethernet.

"CEOs should never say those words. That's my job," he said.

DiPentima's message to CEOs: "It's up to you to provide the vision of where you want the business to go, and it's up to me to help you get there [with enabling technology]. If you don't know where you're going, I can get you there, too, like the pilot who says, 'We're lost, but we're making good time.'"

Source: Speech at the Lattanze Center's CEO/CIO Roundtable, Towson, Md., June 8, 1993.

The price of quality

Information systems departments are hopping on the bandwagon to get their processes certified under the ISO 9000 quality standard, but there is a price to pay: The average cost of an ISO 9000 consultant is $939.50 a day, according to a survey of 300 consulting firms.

Only 111 of 660 consultants covered in the survey were formally trained in International Standards Organization assessments, however, underscoring the importance of checking out a consultant's credentials.

Furthermore, the ISO 9000 registrars charge an average of $13,128 for reviewing a small organization and an average of $31,020 for large organizations. Since 60% of first-time applicants fail to win certification, a half-hearted effort can be an expensive blunder.

Source: National ISO 9000 Support Group, Caledonia, Mich., (616) 891-0161.

Process de-engineering

Despite the hype, most new applications of work-flow software are limited to groups of fewer than 50 people. The reason is that it is inherently difficult to define the steps in a process when it is bigger and more complex.

The solution to "de-engineering" a complicated process — that is, breaking it down into components — is to implement a basic automated work-flow system and then monitor what really happens. Use work-flow reporting software that monitors the work in real time and captures the steps in chart form. Then, adjust the work-flow model on an ongoing basis to eliminate inefficiencies.

Source: "The Delphi Workflow Report" newsletter, May 1993, (617) 247-1025.

Cashless society

It may be time to revisit the idea of using information technology to create a "cashless society," which could eliminate armed robbery for cash, money laundering and tax evasion because all income and transactions would be reported to the government.

The authors of this paper propose a government-run transaction processing network of automated teller machines and personal smart cards. The annual cost of the system would be $5 billion, but it would save the economy $100 billion a year. However, privacy and security issues remain.

Source: "The cashless society: It is feasible," a paper by Craig R. Pilks and Laurence L. Leff, Western Illinois University, Macomb, Ill., (309) 298-2302.

Setting the stage

With so many options to choose from, making a presentation can get sticky. Be careful to select the best medium for the message — and the audience. Consider factors such as corporate culture, room size and setting.

Source: Presentation Products, June 1993, (310) 456-2283.

Joseph Maglitta

Paper slide!

It was a hazy, hot and humid New England morning in August 1992. I arrived at my suburban Boston office early to finish writing an important report. A cup of steaming coffee in hand, I settled down to work.

About 7:15 a.m., the lights flickered, and my terminal screen froze. "Must be too many people running their air conditioners at once," I thought. Irritated, I slapped the side of my terminal.

That didn't work, so I pushed my chair back, got down on my hands and knees and reached under my desk. My systems manager had told me that the quickest way to unfreeze a session is to simply unplug the power cord and plug it back in again. On the way back up, I straightened too quickly, banging my head against the underside of the desk. The next moment, my world turned dark.

Upon awakening, I realized my predicament: Somehow, when I banged my head on my desk, the huge piles of reports, spreadsheets, annual reports, contact lists, newsletters and other computer printouts on and around my desk had toppled onto the floor, completely covering me. I was buried under tons of paper in my office — and suffocating.

Panicked, I flailed my arms, but that only made things worse. A slick, shifting wall of memos, software manuals, employee handbooks, competitive reports, sales summaries, conference proceedings and other documents pressed into my face and chest. My God, I thought, I'm going to choke to death here at my desk!

"Help!" I yelled feebly, but no sound came out. Heavy layers of newspapers and magazines muffled my cries. I tried to rock back and forth to dislodge the paper wall that crushed my head and chest, but it was no use. I was paralyzed.

Lying back, I gasped for breath, cursing myself for not heeding the earlier warnings. How dumb I was! How many times had my boss asked me, begged me, ordered me to toss out anything I didn't

need. On her last visit, she had remarked: "Better hope the fire department doesn't come through here. They'll take you away." If only they'd show up now!

Funny, I mused — a dozen years ago when I started in this business, people used to joke that we'd have paperless bathrooms before we had paperless offices. How right they were!

Time passed. Wild thoughts began to flood my mind. A phrase from a business course I'd taken years ago began to haunt me: "When in doubt, throw it out."

Delirious, I imagined The Super Mario Brothers rescuing me. Leading them was

a database specialist who looked like a Macintosh trash can icon with head, arms and legs. This paper-eating creature ran about gobbling up everything in sight, spitting out a nice stack of neatly labeled floppy disks.

As I became groggy from lack of oxygen, my hand brushed against a cool, hard object. Struggling back to consciousness, my spirit soared. My laptop!

It must have gotten knocked off my desk and pushed under my chair during the paper slide — within usable range!

And even more miraculously, the telephone/modem line was still plugged into its side!

Slowly, painfully, I twisted my wrist to pry open the cover. Because of the tremendous crush of paper, I could only open the top halfway. But that was enough.

Thanks to the easy, menu-driven interface, I was able to log on quickly. The system hummed and beeped comfortingly. I was all set to start the E-mail program when a chilling system message flashed:

Server quota exceeded. Delete unneeded files.

Damn it!, I screamed inside. This is no time for system hygiene! I'm suffocating!

Furiously, I attempted to delete the message. But it was no use; I knew what had to be done. With a groan, I called up my personal directory. In the dim grey light, twisted on my side, I began slowly, systematically scanning each of the hundreds of on-line files. Read. Delete. Execute. Read. Delete. Execute.

After what seemed like days, I reached the bottom of my directory and clacked back to DOS. I never thought I'd be so

happy to see a C prompt! Suddenly, I felt a new strength surge through my body. In a flash, I called up the main menu, invoked E-mail and tapped out a terse note to our company's help desk.

Buried in paper at desk. Cubicle near men's room. Help!

I hit SEND and slumped back, exhausted. At that moment, the whole pile shifted. A massive word processing manual rammed into my rib cage, making it even harder to breathe. Please God, I prayed, just let me hang on a little longer. Soon after, I lapsed back into blackness.

I was wrenched back to consciousness by a loud BEEP. New mail! Pain ripped through my hand as I reached for the laptop. In the half-light, I read the glowing words that made my heart leap for joy:

Have contacted building services. Help coming. Hang on.

By now I could barely feel my typing finger. Somehow I managed to peck out:

God bless you, IS.

As I lapsed back into unconsciousness, a joyous thought spread over me: "I'm saved!"

Announcer: This lucky victim spent the next 90 minutes recovering in the company cafeteria. After three cups of coffee, a glazed chocolate donut and a walk around the building, he went back to work with no ill effect.

Thanks to the crack efforts of highly trained IS professionals, serious injury to the individual or business was avoided. Others might not be so lucky.

If you know of any dangerous paper buildups in your own firm, don't wait for disaster to come along. Actively seek out vital information and put it on-line. Your users and management will thank you.

But don't stop there. To protect against serious on-line "data slides," teach your staff and users to weed out and purge any information that isn't absolutely vital for the functioning of your business. Insist that people regularly clean out their own files and directories. While you're at it, campaign against junk E-mail.

Taking these simple steps could mean the difference between life and death for your organization, your users — and maybe even your job.

We'll be back next week with another Real Office Drama. Until then, remember: Real IS heroes know when to put data on-line and when to take it off. ∎

Maglitta is a senior editor, management, and a recovering fire hazard.

Executive Track

Richard J. Switzky is the new senior vice president of technology and operations at **Metropolitan Financial Corp.** in Minneapolis. At his new post, the former senior vice president and manager of operations support services at Minneapolis-based First Bank Systems will be responsible for management information systems as well as deposit operations.

West Virginia University Hospital in Morgantown, W. Va., has a new distributed systems operations analyst.

Mary B. Wise, who was formerly senior management engineer at neighboring AMS, recently assumed the hospital position.

In Livingston, N.J., **John J. Fischer Jr.** is newly in place as senior vice president and chief information officer at **The CIT Group.** Fischer joined the $13 billion commercial and consumer financing company — a

joint holding of Japan's Dai-Ichi Kangyo Bank Ltd. and New York-based Chemical Banking Corp. — in 1992 as vice president of business applications development.

Prior to that, Fischer served as vice president of technology and strategic services at the New York Stock Exchange.

Lewis B. Redd, formerly senior vice president at First Data Corp., is newly on board as partner in **Ernst & Young's** Atlanta-based health care practice.

Redd brings some 14 years of health care information systems experience to

his new post, including an 11-year stint as a consultant at Andersen Consulting developing strategic and IS plans for hospitals.

James R. Geletka has been named the new executive director of RESNA, a 1,600-member, Washington, D.C.-based interdisciplinary association for the advancement of rehabilitation technologies. He formerly served as executive director of the Information Technology Foundation, an industry-based organization dedicated to developing uses of information technologies that aid disabled people.

WHEN REMOTE ACCESS PRODUCTS WERE TESTED IN THE ARIZONA DESERT, GUESS WHO HAD THE HOTTEST SOLUTION?

The test was part of a comprehensive analysis of remote network access solutions done by *Corporate Computing*. They packed up nine dial-in server products and sent a technician out to do some real field testing—in the town of Sedona, Arizona, pop. 7940.

He dialed in to the ZD Labs LAN in Foster City, California. And when he logged off, he had a winner: Remote LAN Node® (RLN™) from DCA®—a unique software solution that lets up to 16 remote users dial in at once and function just like locally connected PCs.

RLN PROVED IT COULD TAKE THE HEAT.

We'll let the article do the talking. "The best product was Remote LAN Node—a software solution that acts like a multi-protocol router when installed on a PC on a LAN."

The magazine went on to say, "Our winner, DCA's RLN, stood out for its capability to handle multiple communications protocols," commenting that "it won hands-down on flexibility, allowing our remote users to connect to both IPX and IP servers in the same call."

All in all, the article concluded, if you're looking for versatility, "None of the other units we tested came close."

THE BEST SOLUTION UNDER THE SUN.

Remote LAN Node extends the full capability of the network to remote users, allowing them to function as true remote nodes.

RLN is both protocol- and application-transparent. So you can access any network protocol, such as IPX/SPX (Novell®), SPP/IPC (Banyan®), NetBEUI (Microsoft®) and TCP/IP—or any interconnected combination. And, as *Corporate Computing* pointed out, you can access them simultaneously.

You only dedicate one PC as a comm server for 16 concurrent users. And RLN offers three levels of configurable security, including the industry's first Remote Security Adapter.

GET IT WHILE IT'S HOT.

We've quoted *Corporate Computing* a lot. But we'd like you to see more than just a few isolated sentences. So call us, and we'll send you a reprint of the article. We'll also send an informative booklet, "Just Like Being There—A Guide To Remote Network Access."

And finally, we'll let you make the same sort of test *Corporate Computing* did. We'll send a free copy of RLN client software, so you can dial in to our LAN Lab server and judge for yourself.

You won't have to go to the desert. Or even leave your office. But you'll find yourself in a whole new world.

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The CW Guide to Mobile Computing

On the LOOSE

When you outfit your staff with portables, mobility takes on a life of its own. Before long, you'll have new security and networking issues to deal with, as well as a whole host of miniature technologies to explore.

Anyone who has armed users with portable computers should know the monster they've created. Soon you get requests for links to electronic mail; then it's personal information management software. Then they want fax modems, faster downloads, on-line access to the local-area network — it's enough to make you wish the little critters were never invented.

But these requests aren't easily ignored because soon they're coming not just from the users but from the head of sales or, heaven forbid, from the chief information officer himself. That's because many benefits of mobile computing go straight to the heart of COMPETITION.

The smartest companies are examining mobile computing "for the competitive advantage it will give them," says Greg Pellegrino at American Management Systems, Inc. in Roanoke, Va., a high-technology consulting firm.

What's dangerous is that this market is never short on gadgetry. "Vendors show up with their latest feature, and firms get wowed without looking at how it can be meaningfully applied," says Barton Goldenberg, president of Information Systems Marketing, Inc. in Washington, D.C. "The need to establish a mobile computing environment should be market-driven, not technology-driven."

With that in mind, our guide will lead you through the issues of building mobile computing architectures, from the latest hardware features to remote-access techniques to what users are saying about the notebooks they've already bought. ∎

AFTER YOU BUY

- "What about my E-mail?" Or, what happens after you've outfitted the staff with mobile computers.

WHAT'S IN THE BOX

- What you REALLY need in a notebook computer.
- A quick look at the smaller bunch, including subnotebooks, palmtops, personal digital assistants and more.
- Plus . . . the hottest new features in notebooks.

REMOTE LINKS

- Two ways to hook remote users to the LAN.
- Plus . . . vendors that can help with your remote-access needs.

USER RATINGS

- IBM scores highest satisfaction among top color notebook models.
- Firing Line participants give Apple's PowerBook 180C rave reviews.

Is there anything your mainfra

Once upon a time, mainframes and networks didn't get along. They were so different, they feared each other. But now, with the upswing in downsizing, client/server and PC networks, mutual cooperation is in order. So you're probably asking: *"How can I leverage my investment in mainframe applications and data to benefit my network clients?"* Which is tough enough to say, let alone do.

We have a simple suggestion: let your big strong mainframes help your smaller networks with NetWare® for SAA. NetWare

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for SAA integrates mainframe and NetWare environments, giving DOS,

Beyond the notebook

AFTER YOU BUY

By Stephen Rood

Mobile computing doesn't just mean notebooks anymore — or subnotebooks for that matter. No, it runs much deeper — and much closer to the business — than that. As soon as you hand an executive or a salesperson a notebook, you've opened the floodgates.

"If you give somebody a mobile computer, the next thing they ask is, 'What else can I do?' " says Andy Seybold, publisher of the "Outlook on Computing" newsletter.

And for good reason. The executive who can access electronic mail faster or the salesperson who can deliver an order faster is a contributor to the bottom line.

"[We had to] address this technology

Bausch & Lomb reps remotely download reports that forecast sales.

David Phillips
Bausch & Lomb

first before our competitors did," says William O. Bauserman, vice president and director of MIS at O'Sullivan Corp., a manufacturer of soft plastics in Winchester, Va. The company is in the beginning stages of outfitting its 45-member sales force with notebooks that dial into the local-area network server to access updated inventory data and place orders electronically.

Remote LAN access is one of the hotter topics these days in terms of setting up a mobile computing architecture. According to a recent Forrester Research, Inc. report, network vendors offering mobile LAN solutions will see revenue increase

Rood is a consultant based in Ossining, N.Y.

from $529 million this year to $2.8 billion by 1997.

Forrester attributes the high interest in mobile LAN access to two factors: the move to client/server (and the accompanying demand to access information on host systems) and the increase in LAN-based sales, marketing and service applications (see chart below).
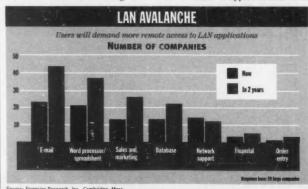
One of the most common reasons for establishing remote LAN access is E-mail. At MCA/Universal Studios, a "remote LAN" was built to allow division executives to remotely access E-mail on the Apple Computer, Inc. LocalTalk LAN as well as corporate financial information downloaded from an IBM 3090 and Application System/400. Each executive uses an Apple PowerBook equipped with a 9.6K or 14.4K bit/sec. modem.

But even with just 10 to 15 people dialing in, MCA/Universal has already tangled with some of the issues that industry analysts say will hit any information systems department supporting remote access. These issues range from establishing security and monitoring use to allowing adequate network bandwidth and tracking software licensing.

At MCA/Universal, network response has already become a concern. The company is currently using LocalTalk-based modems from Shiva Corp. and achieving a throughput of 250K bit/sec. It plans to switch to Ethernet-based NetModem/Es, also from Shiva, to achieve Ethernet's 10M bit/sec. throughput, according to Thes Hansen, technical consultant at the company.

But an even bigger concern with dialup access is security. The very first decision you must make when providing LAN access, Seybold says, is: "Do you put a modem on everyone's desk or do you put a communications server on the network and let people go in through the server?" Either way, he says, there are security concerns and, in the latter case, a lot of unknowns.

In most cases, current security needs to be beefed up, Seybold says. The most common techniques are dial-back, where the modem calls back the person requesting access to ensure identity, and varying levels of password protection. Hansen relies on the user ID and password features of AppleTalk Remote Ac-

LAN AVALANCHE

Users will demand more remote access to LAN applications

NUMBER OF COMPANIES

Legend: Now / In 2 years

E-mail, Word processor/spreadsheet, Sales and marketing, Database, Network support, Financial, Order entry

Source: Forrester Research, Inc., Cambridge, Mass.

cess. However, it is not compatible with MCA/Universal's primary security system, Datalock, which resides on the mainframe systems.

Common sense is one of the best safeguards. At Rochester, N.Y.-based Bausch & Lomb, sales technology manager David Phillips sends his sales force their Toshiba America Information Systems, Inc. laptops separately from a diskette containing the telephone numbers and passwords needed to access the LAN.

Phillips also limits the information users can access or download, a technique that also quells bandwidth concerns.

The Bausch & Lomb sales force automation system supports Lotus Develop-

A remote account servicing system "has positioned us to respond better than our competition."

Mike Mulligan
Applied Data
Systems

ment Corp.'s CC:Mail and report distribution to a staff of 40 sales representative and managers.

In some cases, it's not enough for users to just download files from the LAN; they need to operate as a full-functioning node, as if they were in the office. This has sprung the lock on a new type of LAN access, called "remote node" (see chart page 116).

With remote node access, users are full-functioning nodes on the LAN. With the more traditional "remote control" technique, users become terminals to LAN-attached PCs.

According to Forrester, new software is emerging that was specifically designed to run in a remote node environment, including mail, file transfer and application software. Examples include

Notes, CC:Mail Remote, Traveling Software, Inc.'s Laplink and Xcellenet, Inc.'s RemoteWare (see story page 117).

Beverage Distributors Corp. in Denver used RemoteWare to set up a sales force automation system that employs an "update server." This type of device is something a lot of companies are starting to use to provide periodically updated information on, say, the latest inventory counts or patient records in a hospital.

In Beverage Distributors' case, the server is a 486 PC that downloads information from an IBM 4381 to provide the 120-person sales force with updated inventory information and a means to process orders of liquor sales to stores and restaurants, says Mike Mulligan, president of Applied Data Systems, a division of Beverage Distributors.

RemoteWare provides an easy-to-use front end as well as connectivity to the server. "The system helps the salespeople throughout the day as they call on various accounts and process orders directly on-site using a 386 notebook PC," Mulligan says.

For example, a salesperson for a restaurant can work with the owner to compile a seasonal wine list and be sure that the wine will be available for delivery. Seen in this light, mobile computing is an emerging technology with a plethora of new issues to consider. But while most of the technical problems can be solved, answers to the management issues are not so clear-cut. For instance, Barton Goldenberg, president of Information Systems Marketing, Inc. in Washington, D.C., asks, "How safe is mobile computing [referring to the recent wireless cellular health concern]? How will this new technology affect sales team spirit with everyone always out in the field? Who's going to train the growing number of remote computing users?" (For more on management issues, see story page 97.)

With all of this to consider, it's clear that this small-format technology will continue to create anything but small changes for IS departments with users on the move. ∎

Where wireless fits in

t's still not entirely feasible for most companies to consider wireless technology to meet the remote access or E-mail needs of a geographically dispersed sales team. All three options demand high transmission costs per character, and each poses its own hurdles:

• Satellite offers seamless, nationwide coverage but at a price up to 20 times that of land.

• Cellular is cheaper than satellite but offers uneven quality between cell sites. Also, the degree of possible contention with existing cellular voice traffic is unknown, and security in data transmissions remains a concern.

▪ Specialized mobile radios offer proprietary network protocols that cannot be used with existing corporate

applications without extensive customization.

What's more doable is to create a wireless system that allows remote access or E-mail within a building or campus. Likely applications would be medical reporting and inventory management, as long as users are within 500 feet of the server when indoors or within 800 feet when outside.

That's what is promised with new products from NCR Corp. with its soon-to-be-released WaveLAN/PCMCIA product and Proxim, Inc. with its RangeLAN/PCMCIA offering. Both of these products use the Personal Computer Memory Card International Association (PCMCIA) Type-II plug-in card slot now offered on most new notebook PCs.

Making sense of features

WHAT'S IN THE BOX

By Keith Richard Aleshire

Portable computer makers excel at marketing new gadgetry. But with prices 30% to 40% more than those of comparable desktop models, you certainly don't want to fall for the latest craze.

There are not only more features but also more size categories. Laptops and notebooks are in the "over-four-pound" grouping, while subnotebooks, pocket organizers, palmtops and the very new personal digital assistants are in the less-than-four-pound category (see chart below).

Of the lot, notebook computers are stealing the show at a slim four to seven pounds. Subnotebooks — at just under four pounds — eliminate the built-in floppy drive, have smaller keyboards and require you to carry an external drive or a cable and software to transfer files.

Aleshire is an independent author and writer, as well as owner of Minneapolis-based Computer Consumer Services, Inc.

Palmtops offer lots of portability, as they can last for weeks on ordinary AA batteries. However, tiny keyboards make typing-intensive applications impractical. Hence, palmtops tend to be used as electronic calendars, calculating machines and contact lists.

Since the majority of people still choose notebooks, we've outlined the features you should be aware of and how to select among them:

Screen possibilities

Most notebook screens today use backlighting or edgelighting to improve readability, especially in dim light. A few exceptions, such as Dell Computer Corp.'s 320SLI, exclude backlighting to lengthen battery life. If your users will ever need to work in a dim area, though, insist on backlighting.

Most LCDs use passive-matrix displays, where each dot, or pixel, on the screen shares electrodes with other dots. Because of this sharing, passive screens can't keep up with the movement of the mouse pointer in Windows, causing it to blur or "disappear" if you move it quickly, reappearing wherever it stops on-screen.

The more expensive active-matrix screens (also known as thin-film transistor or TFT) have a separate transistor

HOW SMALL CAN YOU GET?

The industry continues to churn out tinier and more functional devices.

POCKET ORGANIZERS
- **Average price:** $300.
- **Weight:** Less than 1 pound.
- **Description:** Shirt-pocket-size machine for organizational applications.
- **Typical user:** A mobile user who does not need communications capabilities.
- **Future capabilities:** Data import/export.
- **Vendors:** Zeos International Ltd.'s Zeos Pocket PC; Casio's Boss; Sharp Electronics Corp.'s Wizard; Hewlett-Packard Co.'s 95LX, 100LX.

HANDHELD COMPUTERS
- **Average price:** $1,500.
- **Weight:** Less than 1 pound.
- **Description:** 8086-based machines that are specifically programmed and contain an inexpensive docking station.
- **Typical user:** Field service person with data entry applications.
- **Future capabilities:** More vertical applications.
- **Vendors:** American Mitac Corp.'s Mitac 1600A; Atari's Portfolio; Epson America, Inc.'s EHT-29; Fujitsu Personal Systems, Inc.'s Poqet PC; Psion, Inc.'s HC series, Organiser II, Series 3 Palmtop; Sharp's PC-3000 Palm Executive; Vortex Systems, Inc.'s PT-100.

HOT TECHS

Some notebook features to consider

ACTIVE-MATRIX SCREENS

These screens provide higher contrast, a wider viewing angle and faster screen refreshes than passive-matrix screens. Unfortunately, they also require more power. To avoid the premium of color, consider an active-matrix monochrome screen, available from Apple and Compaq.

LOW-ENERGY PROCESSORS

Instead of putting the usual desktop processor into the laptop, some vendors are incorporating low-energy chips. These processors require less energy; in fact, the Intel 486SL can last twice as long as a 386SL in a laptop at full power.

NICKEL-METAL HYDRIDE BATTERIES

These batteries provide 80% longer battery life, and you can recharge them when they are not yet fully worn down without shortening battery life.

PCMCIA SLOT

PCMCIA slots allow you to plug a device the size of a credit card into your laptop. Check that the laptop and cards support Version 2.0, which allows you to run software from the card without a performance penalty.

BUILT-IN POINTING DEVICE

Because of the rise of GUIs, more people prefer built-in pointing devices to toting around a portable mouse. Try out the ergonomics of the trackball's location, especially if buying for left-handed employees. Center placement may be best.

PERSONAL DIGITAL ASSISTANTS

- **Average price:** $1,000.
- **Weight:** Less than 3 pounds.
- **Description:** A powerful, handheld communications-intensive device with a focus on ease of use.
- **Typical user:** PC-phobic mobile users who desire two-way communications, for either business or personal use.
- **Future capabilities:** More subscribers, an interface to standard E-mail, more information to query.
- **Vendor sampling:** Tandy Corp./Casio's Zoomer; Apple Computer, Inc.'s Newton; Sharp (not yet shipping).

SUBNOTEBOOKS

- **Average price:** $2,000.
- **Weight:** Less than 4 pounds.
- **Description:** A device with full PC functionality but with a reduced keypad and screen and no floppy drive.
- **Typical user:** User with non-RAM-heavy applications.
- **Future capabilities:** Voice and fax capability, cellular communications, standard docking stations.
- **Vendor sampling:** Apple Computer, Inc.'s PowerBook Duo; Dell Computer Corp.'s 320SLI, 325SLI; Dauphin Technology, Inc.'s DTR-1; Gateway 2000, Inc.'s Handbook; HP's OmniBook 300; IBM's ThinkPad 500, Zeos' Conenda, Zenith Data Systems' Z-lite

PEN-BASED DEVICES

- **Average price:** $3,000.
- **Weight:** Less than 6 pounds.
- **Description:** A device with an input stylus using either the PenPoint or Pen Windows operating system.
- **Typical user:** Field service person with data entry applications.
- **Future capabilities:** More applications and handwriting recognition.
- **Vendor sampling:** AST Research, Inc.'s Pen Exec; Grid Systems Corp.'s Grid Convertible, Grid Pad; IBM's ThinkPad 700T, 710T; Logitech, Inc.'s Pen Reference Design; Microslate, Inc.'s Datelite; NCR Corp.'s 3130 NotePad; NEC Technologies, Inc.'s Ultralite; Toshiba America Information Systems, Inc.'s T100 X Dynapad.

Source: Meta Group, Inc., Westport, Conn., and *Computerworld*

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for each pixel, providing quick response and razor-sharp images. Monochrome active-matrix screens are found on some Apple Computer, Inc. Power-Books and on Compaq Computer Corp.'s LTE Lite/25E.

Selecting a color screen is a choice between money and vivid color. Passive-matrix color LCDs add only $500 to $800 to a portable notebook's price, but colors tend to be washed out. Active-matrix color screens provide better colors than does a desktop computer — but jack the price up $700 to $900 over passive-matrix color.

The ultimate battery

Most notebooks still use a rechargeable nickel cadmium (NiCad) battery pack, which gives the user a battery life of about two to three hours. One problem with NiCad batteries is the "memory effect," where the battery recognizes ever-earlier charge points as its limit until it becomes unusable.

For this reason, nickel-metal hydride, or NiMH, batteries are slowly replacing NiCad batteries.

However, while they provide
Hardware, *page 114*

Hardware

80% more battery life, they also come with a 50% price premium.

Tied up at the dock

If your users use a single machine to serve them in-office and on the road, consider docking stations. A docking station is an encasement the portable plugs into, providing additional expansion slots and a larger hard drive.

An external monitor is usually placed on top of the docking station so that, in effect, the portable serves as the "brain" of the docking station. Toshiba America Information Systems, Inc.'s Deskstation IV, for example, has two expansion slots and ports for an external monitor and keyboard.
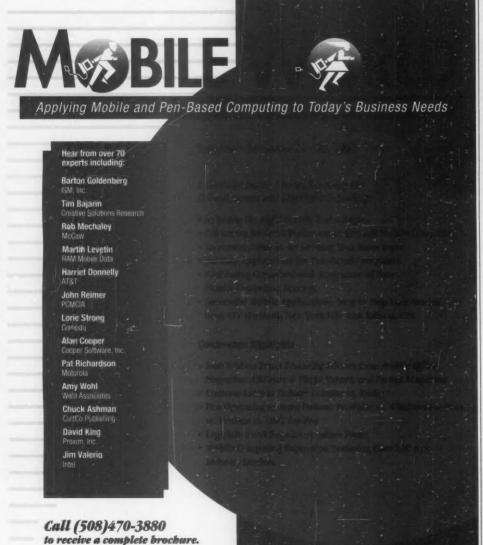
An alternative is the smaller port replicator strip. Zenith Data Systems and AST Research, Inc., among others, offer these devices, which let you attach or detach a notebook from a desktop keyboard, monitor and printer in one step.

PCMCIA convenience

You've probably been hearing a lot about that way-too-long acronym PCMCIA, which stands for the Personal Computer Memory Card International Association specification. Once you get past all the letters, the technology is quite useful. It puts modem, fax, storage or local-area network connection capabilities on a small PC card that slides into a thin slot on compliant notebooks. A 2- by 3-in. PC card can provide an RJ-45 plug to connect a notebook to a network.

There are three and soon to be four designs of PC cards. All three types use the same female 68-pin edge connector but differ in thickness. Type I accommodates thin memory cards; larger Type II PC cards provide LAN connections or modems; and Type III cards can accommodate cards with moving parts, notably hard disks of 100M bytes or greater.

SUBNOTEBOOK GROWTH

Subnotebooks will experience dramatic growth, says Jeff Henning, senior industry analyst at BIS Strategic Decisions. He expects subnotebook sales to more than triple between '92 and '93. But they won't overtake the industry. The reasons, Henning says, include the fact that they're less powerful, lack floppy drives and people prefer the notebook form factor.

Currently, you cannot add or remove PCMCIA cards without turning off your computer. But eventually, you will be able to do things such as use a modem card to download information from another computer, remove the modem card and insert a flash memory card to copy the data while your portable is still on.

Many low-end and high-end portables now include a PCMCIA slot.

Insist on PCMCIA cards that comply with the PCMCIA 2.0 standard released last September. It allows applications to run directly from the card, start more quickly and not require random-access memory. The technology is still new; most vendors are reluctant to install the crucial PCMCIA socket services, which read cards, onto their systems. This forces PC card makers to write separate drivers for each vendor's machine.
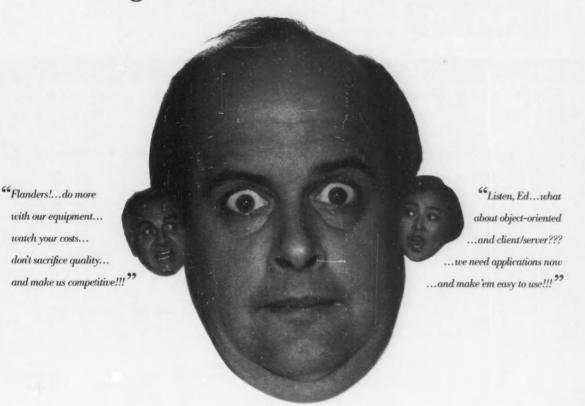
Of mice and modems

If your users run Windows, you'll need to consider either a machine with a built-in pointing device or one of the many portable mice. Placement differs from vendor to vendor. Compaq, for example, places its trackball next to the screen.

AST and Zenith Data have copied Apple's ambidextrous PowerBook design by putting a trackball front and center, below the space bar. Others use the cursor arrows as mouse keys or provide a special mouse key that responds to fingertip pressure in all directions.

IBM's TrackPoint II, a little red stick in the middle of the keyboard, is also on the market. ∎

Diagnosis: *Acute Demanditis*

"Flanders!...do more

with our equipment...

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don't sacrifice quality...

and make us competitive!!!"

"Listen, Ed...what

about object-oriented

...and client/server???

...we need applications now

...and make'em easy to use!!!"

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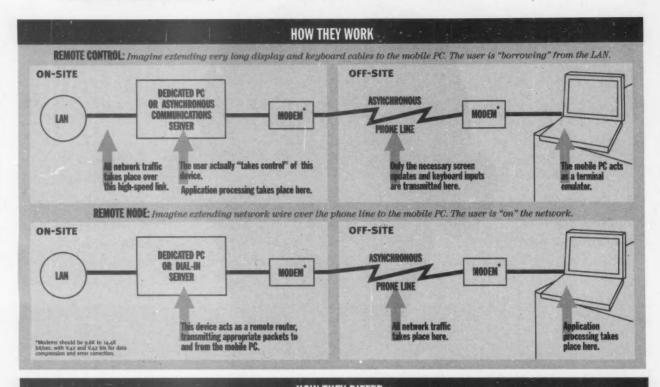
R A P I D   A P P L I C A T I O N   D E V E L O P M E N T

Two ways to make the LAN connection

REMOTE LINKS A new technique turns mobile PCs into live nodes, not terminal emulators

HOW THEY WORK

REMOTE CONTROL: *Imagine extending very long display and keyboard cables to the mobile PC. The user is "borrowing" from the LAN.*

ON-SITE

LAN — DEDICATED PC OR ASYNCHRONOUS COMMUNICATIONS SERVER — MODEM*

All network traffic takes place over this high-speed link.

The user actually "takes control" of this device.
Application processing takes place here.

OFF-SITE

ASYNCHRONOUS PHONE LINE — MODEM*

Only the necessary screen updates and keyboard inputs are transmitted here.

The mobile PC acts as a terminal emulator.

REMOTE NODE: *Imagine extending network wire over the phone line to the mobile PC. The user is "on" the network.*

ON-SITE

LAN — DEDICATED PC OR DIAL-IN SERVER — MODEM*

This device acts as a remote router, transmitting appropriate packets to and from the mobile PC.

*Modems should be 9.6K to 14.4K bit/sec. with V.42 and V.42 bis for data compression and error correction.

OFF-SITE

ASYNCHRONOUS PHONE LINE — MODEM*

All network traffic takes place here.

Application processing takes place here.

HOW THEY DIFFER

Advantages

REMOTE CONTROL
Secure environment because data files remain on the network. Minimal asynchronous traffic, as only screen updates and keyboard inputs are transmitted. Processing speed is determined by the LAN node rather than the mobile PC.

REMOTE NODE
More intuitive because the user treats the remote connection the same as a local one. Typically a lower cost per node. Graphics applications tend to run better.

Cost

REMOTE CONTROL
Typically more expensive per port because there must be either a dedicated PC or an asynchronous communications server with a dedicated PC board for each dial-in port.

REMOTE NODE
No need for a dedicated PC board for each dial-in port. As a result, typically less expensive on a per-port basis.

Best applications

REMOTE CONTROL
Must be server-based. Best suited to DOS server/workstation applications or those requiring significant network traffic (as the actual network packets aren't transmitted over the asynchronous line). Best for on-line, interactive applications such as databases, order entry, inquiry, certain E-mail packages, etc.

REMOTE NODE
Must reside on the mobile PC. Better suited to graphics and client/server applications as well as those requiring relatively little network traffic. Also better for programs such as word processors and spreadsheets where the user can work off-line, using the network primarily for file transfer and related operations.

Disadvantages

REMOTE CONTROL
No direct-access drives on the mobile PC. Not as intuitive because users must remember they're controlling another PC, not their own. Graphics applications can be slow.

REMOTE NODE
Performance will be degraded with high-traffic applications. File downloads may be slow because of phone lines. Potential for security loss, as sensitive files can be easily moved from the network to the mobile PC.

User interface

REMOTE CONTROL
Typically not as intuitive, as users must constantly be aware that they are controlling a different PC than their own. This is particularly true for file transfer, where a separate file-transfer utility is used instead of the traditional COPY or XCOPY commands.

REMOTE NODE
The user interface is exactly the same in a remote or local environment. The user has direct access to the local drives in the mobile PC and can use standard COPY or XCOPY commands to transfer files to and from a network file server.

Number of users supported

REMOTE CONTROL
Because users work on-line with remote control and their sessions tend to be longer, fewer users per port can be supported (typically in the range of 10 to 20 users per port).

REMOTE NODE
Because remote node connections are typically shorter (more of the user's work is performed off-line), remote nodes can support more users per port (typically 20 to 40 users per port).

WHERE TO GET THE PRODUCTS

ASYNCHRONOUS COMMUNICATIONS SERVERS

Centrum Communications, Inc.'s CentrumRemote
San Jose, Calif.

Cubix Corp.'s LCS/ACS
Carson City, Nev.

Gateway Communications, Inc.'s LAN Expander
Irvine, Calif.

Integrated Workstations, Inc.'s Communique
San Jose, Calif.

J&L Information Systems, Inc.'s Chatterbox
Chatsworth, Calif.

Novell, Inc.'s Shared Access LAN Modem
Provo, Utah

U.S. Robotics, Inc.'s Shared Access Communications Server 386
Skokie, Ill.

DIAL-IN SERVERS/SOFTWARE

Cayman Systems, Inc.'s GatorLink
Cambridge, Mass.

Digital Communications Associates, Inc.'s Remote LAN Node
Alpharetta, Ga.

Gateway Communications, Inc.'s LAN Expander
Irvine, Calif.

Microtest, Inc.'s LANModem
Phoenix

Shiva Corp.'s NetModem/E, LanRover/E
Cambridge, Mass.

Telebit Corp.'s NetBlazer ST, NetBlazer 40
Sunnyvale, Calif.

UDS Motorola's LanFast
Huntsville, Ala.

U.S. Robotics' Shared Access LAN Modem, Shared Access Communication Server 386
Skokie, Ill.

REMOTE CONTROL SOFTWARE

Central Point Software, Inc.'s Commute
Beaverton, Ore.

Microcom, Inc.'s Carbon Copy
Norwood, Mass.

Norton-Lambert Corp.'s Close-up
Santa Barbara, Calif.

Ocean Isle Software's ReachOut
Vero Beach, Fla.

Symantec Corp.'s pcAnywhere
Cupertino, Calif.

Triton Technologies, Inc.'s CO/Session
Iselin, NJ

A third consideration: Remote-ready apps

A long with "remote control" and "remote node" comes another alternative for remote LAN access: remote-ready applications.

These programs were specifically designed for remote use with modems over a phone line. Lotus' CC:Mail Remote (a companion product to CC:Mail), for example, allows remote users to download their mail via modem and then work off-line to reply to the messages and/or create new ones. On the next connection to the network, these messages are uploaded and new ones downloaded, etc.

This type of off-line operation can make remote-ready applications very appealing to the mobile professional.

Because they run in the mobile PC, remote-ready applications act more like remote node than remote control. Many of them, however, require a dedicated PC on the LAN to act as a gateway for the remote users. And while they can be efficient and simple to use, they often don't provide all of the functionality of their conventional counterparts.

In addition, since they're dedicated applications, they don't satisfy the need for a general remote LAN access solution. On the other hand, if you need remote LAN access only for a specific application, such as E-mail, remote-ready applications can be a viable solution.

These programs are few and far between, however, and you should investigate carefully to make sure the one you choose has all the features you need. In the future, remote operations will increasingly be built into conventional applications.

Steve Magidson is an independent consultant specializing in networking and portable connectivity. He can be reached on CompuServe at 72727,3205.

Software distribution

REMOTE CONTROL
Software updates and distribution are simplified because the applications are server-rather than mobile PC-based.

REMOTE NODE
As applications are updated, they must be distributed to each mobile PC user. This can cause additional work for network administrators.

Popularity

REMOTE CONTROL
Has about 60% market share, but that's dropping. Still more popular when multiple ports need LAN access. Often used when individuals simply need to access their desktop PC from a remote portable, often without the need for LAN access.

REMOTE NODE
Increased in popularity in the past year. Trends toward client/server and GUIs indicate it will become the predominant choice within the next one to two years.

Impact on management

REMOTE CONTROL
Network management is centralized because the nodes are locally connected to the LAN.

REMOTE NODE
While some solutions support tools such as SNMP, network management can be more difficult because the actual network nodes are remote from the LAN.

Security

REMOTE CONTROL
Because most solutions use a separate utility for file transfer and this utility can be disabled on a user-by-user basis, remote control can offer additional security by restricting which mobile users can transfer files to or from the file servers, irrespective of their access rights in a local environment.

REMOTE NODE
Users have the same access rights in a remote environment as in a local one, including the ability to copy potentially sensitive files to or from the network. There is typically no convenient way to give a user different access rights in a remote vs. local setting.

Software licensing

REMOTE CONTROL
Two issues: First, you need to acquire only one software license for each LAN node on the network, as this is where the applications are actually executed. The number of LAN nodes is typically much lower than the total number of remote users. Secondly, most remote control products charge a separate license fee for each remote user, although this fee is nominal.

REMOTE NODE
Because applications reside on the mobile PC, there must be as many licenses as there are mobile PCs. Network managers must be careful, however. Since requested applications are downloaded and can often be stored on the mobile PC if they don't already reside there, it is possible for a user to inadvertently violate a license agreement. And as with remote control, many remote node vendors charge additional license fees for their software based on the number of remote users.

White
Paper

WORKFLOW:

Redesigning the Enterprise

Buying an imaging and workflow solution shouldn't necessitate reengineering your budget.

It's a pretty much agreed upon principle that the whole purpose of business process reengineering is, ultimately, to save money and boost profits.

So why is it that so many companies are considering imaging and workflow solutions so costly to implement that any benefit is offset by the capital outlay and maintenance?

A bottomless bottom line.

A lot of imaging vendors talk about how "easily" their systems fit in to your business process. They'll try to dazzle you with examples of the positive impact their system could have on productivity in your organization. Some will even offer complicated analyses which show just how much money your company could save — if only you implemented one of their solutions.

However, what they *don't* like to talk about is how much money your company will have to spend to implement their system in the first place.

The high price of productivity.

All those wonderful gains in productivity come at a pretty hefty price. Most imaging and workflow solutions have a bare bones price of $1000 or more *per user*. And that's just for the basic software. What about the cost of hardware? Or developing and implementing an indexing system for your documents? And how about developing the workflow application? A number of so called "solutions" won't even work with your current systems!

All of this ultimately defeats the purpose you originally had in mind when you first considered an imaging and workflow solution — saving money.

Cost Per Seat Comparison

$1500	
$1250	
$1000	
$750	
$500	
$250	
0	TechKNOWLOGY IBM ImagePlus ViewStar FileNet LaserData GroupFile Wang

A sane solution.

TechKNOWLOGY has an alternative. A full-featured imaging solution at a cost of as little as $395 per user. And, that buys you a *lot* of power and performance. Like scan rates 50% faster than ViewStar, 87% faster than LaserData and more than *twice* as fast as FileNet. And you get lightning fast *automated* document indexing, group III/IV fax compatibility, jukebox support, and built-in scalability.

A real team player.

Unlike most of the solutions available, TechKNOWLOGY's imaging and workflow solution was designed and written to work at the *deepest level* of Novell Netware. Which means you get *significantly* higher performance and speed for your applications. And there's never a compatibility issue. Which means you don't lose a penny on your investment in current technology. In fact, Novell liked our solution so much they now use it as their *performance standard* in evaluating imaging systems.

A simple matter of addition.

Lower cost. Better performance. True compatibility. If you're considering an imaging and workflow solution for your company, it all adds up to TechKNOWLOGY.

If you'd like more information about the TechKNOWLOGY imaging and workflow solution, or a copy of the white paper "Selecting an Electronic Document Imaging Solution," call us at (800) 264-0713 or write:

TechKNOWLOGY, Inc.
141 East 5600 South, Suite 300
Salt Lake City, UT 84107

TechKNOWLOGY®
The Imaging and Workflow Solution for Novell Networks.

Introduction

Over the past several years, the computer market has been increasing its focus on the concept of business process automation. This is due in large measure to two factors. The first is a recognition among business and information systems (IS) executives that competitiveness in the '90s demands automating the entire process of doing work, not just the individual discrete tasks.

The second factor is the emergence of a new universal desktop computing environment — one capable of truly integrating multiple windowed applications while networked to other equally powerful desktop systems throughout the enterprise.
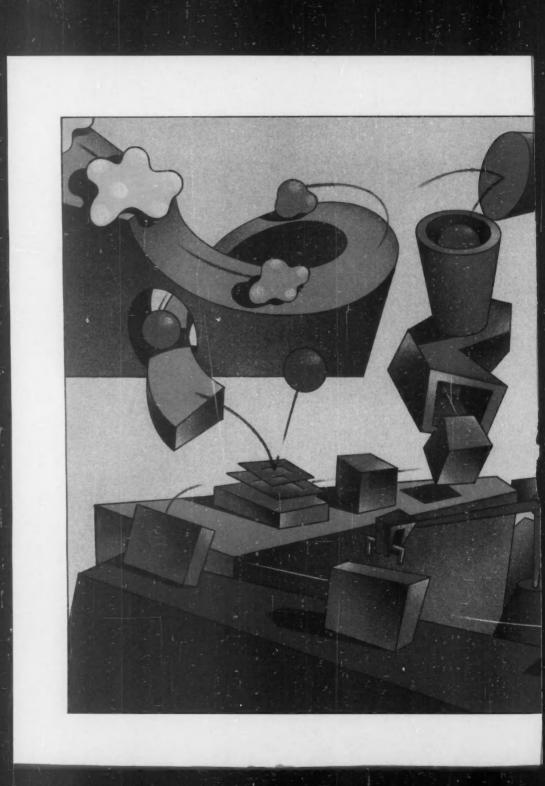
Despite the huge investment in white collar work automation over the past 25 years, many studies have shown that office productivity has not substantially increased. This stands in stark contrast to factory automation, where investment in computing technology has dramatically increased the manufacturing output per worker.
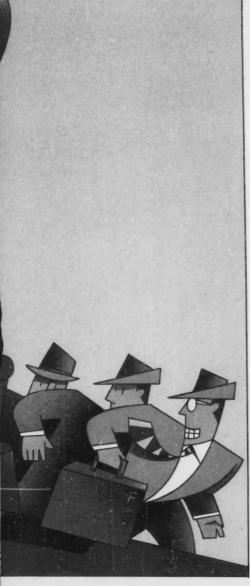
The rise of global competition for markets has now made productivity a basic survival issue for most companies, and in recent years there have been tremendous changes in the way companies are organized to perform office work. Those changes include decentralization, flatter management structures and more sophisticated information systems strategies.

Even as companies continue to invest in computing power, however, it has become clear that there is something in the nature of office work that resists improvement no matter how much power is brought to bear. This resistance can only be overcome with a new kind of software that deals directly with the inherent nature of the business process. Such software must integrate both information from multiple applications and the contributions of many individuals within the organization.

Driven by the combination of tremendous economic pressure and the recent transformations in office computing, this software — workflow software — has arrived.

Like many high-tech buzzwords, "workflow" is frequently mentioned and widely misunderstood. Simply defined, it is the process by which individual tasks come together to complete a transaction — a clearly defined business process — within an enterprise.

Such transactions may occur repetitively in the normal course of business and follow a standard set of procedures — processing an insurance claim is a good example. Or they may be purely ad hoc, occurring rarely and in ever-changing forms. In either case, they involve the coordination of multiple applications or users. As a result, they need to be tracked and automated.

WORKFLOW: Redesigning the Enterprise

Some transactions are not part of the regular business process, but recur from time to time and follow a more or less standard procedure. These may include a check clearance request, a travel authorization or the scheduling of job candidate interviews.

A transaction or process may be relatively simple, consisting of only a few steps. Example: take a customer's call, find the requested information or activity

status and pass the requested information back to the customer. Or the transaction can be extremely complex, spanning many different departments, requiring the involvement of a dozen or more individuals, and consisting of hundreds of discrete tasks. Workflow automation in the broadest sense includes both of these situations.

Production vs. Ad Hoc Workflow

While establishing the broad business need for workflow software and services is easy, defining the market for them is more complex. The market is formative, and most users are still trying to understand basic concepts and the relative values of specific functions.

There is a variety of workflow software products currently available. Some automate a line-of-business process while others manage a general office procedure. Some are intended to be used by clerical workers, while others are designed for professional, "knowledge" workers.

Savvy would-be users have to understand their own needs before buying workflow software. They should ask themselves if their work is driven by documents or folders, or if it is better viewed as a set of tasks and decision options that may or may not include attached documents.

Perhaps the best way to differentiate workflow software products is by breaking them into two categories: production workflow and ad hoc workflow.

Production workflow software automates repetitive mission-critical processes such as insurance claims, loan origination, accounts payable or sales order entry. Most often, these processes are clerical, document-driven and tightly integrated with line-of-business computer applications. They may, however, represent a routine office activity such as a travel authorization or an expense report. In a production workflow environment the process obeys sets of codified rules and policies that are consistently applied to every work item.
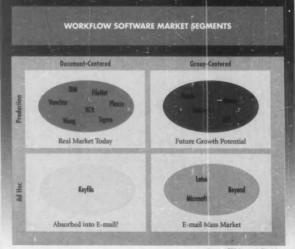
Ad hoc workflow, on the other hand, automates unique or occasionally used processes. These processes may be mission-critical to the core business but are more often associated with routine office procedures, such as correspondence management, interview scheduling or document revision and approval. They are typically used by knowledge workers, but are not usually document-driven or tightly integrated with line-of-business application software.

With ad hoc workflow software, the process required for a given work item is not predefined, but more a matter of individual judgment and decision. Where production workflow software seeks control and transaction efficiency by integrating information, ad hoc workflow software is more concerned with coordinating and integrating human activity.

The majority of the workflow software business today is concentrated on the production side. And most of that has been associated with document imaging technology. The software has largely been provided by the document image management vendors. The use of imaging technology with workflow software is not a requirement — the need for workflow automation goes far beyond the imaging market — but it is a common occurrence.

In the mid-'80s, FileNet Corporation was the first to perceive that the essential problem document imaging solved for businesses overrun with paper was not so much storage and retrieval as much as it was moving and coordinating paper-based information throughout a department or enterprise. In a word, work-

WORKFLOW SOFTWARE MARKET SEGMENTS

	Document-Centered	Group-Centered
Production	IBM FileNet ViewStar Plexus NCR Wang Sigma	Reach Gates Delrina Oct
	Real Market Today	Future Growth Potential
Ad Hoc	Keyfile	Lotus Beyond Microsoft
	Absorbed into E-mail?	E-mail Mass Market

Source: BIS Strategic Decisions

Production workflow software automates critical repetitive processes, while ad hoc workflow software automates unique or occasionally used processes.

flow. FileNet put workflow automation tools at the heart of its document imaging software. The company defined the core set of services, development tools and administrative functions that virtually all document imaging vendors offer in some form today.

The association of imaging with workflow is a natural one because the businesses with the biggest transaction processing costs are typically ones with high-volume, paper-driven operations involving complex interactions between multiple users. Because paper-processing costs are high, the value of improving transaction efficiency with workflow software is also high.

For this reason production workflow software, particularly in conjunction with imaging, can command prices of $2,000 per user or higher and still generate a high return on investment.

Where production workflow software usually can be justified by reducing the cost of a particular business process, ad hoc workflow software is geared to a less specific need. The buyer's motivation for purchasing ad hoc workflow software comes from a sense that routine office work needs new tools for coordinating and tracking activities that involve multiple users.

Despite the proliferation of E-mail for point-to-point messaging, and specific personal productivity tools like project management or calendar software, these products by themselves do not track and coordinate processes involving multiple steps or multiple users.

Unlike the situation with production workflow software, the need for ad hoc workflow software is quite broadly based, touching essentially all office workers. This need will continue to expand, as will the number of ad hoc users.

The demand for ad hoc workflow software is a logical by-product of the tremendous growth in PC networking and E-mail, the most significant computing phenomena of the '90s. Without workflow software, users today are connected over the network but unable to fully coordinate their work. Workgroup productivity suffers accordingly. Workflow software aims to rectify that situation.
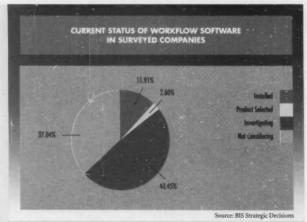
Unfortunately, in the case of routine office work, the cost of not having workflow software is difficult to calculate. Cost-justifying ad hoc workflow software is hard because the cost of the process it improves is unknown. How much is it worth? If it is viewed as an extension of E-mail or a network operating system, does that mean it is worth only a fraction of those packages? In this environment of uncertainty, workflow software's value is being determined by the norms applied to mass market PC applications. Consequently, the ad hoc workflow software market, in contrast to the production workflow market, is more likely to be driven by the mass market players.

Workflow Software Market Segmentation

Although production and ad hoc workflow are the two most notable workflow software elements, there are others. They include "document-centered" versus "user-centered" tasks. In a document-centered task, the required processing is determined by a work package, often a document or folder. User-centered tasks are more general and are performed by multiple users in a coordinated fashion.

Document-Centered Production Workflow

Of document-centered versus user-centered applications, the document-centered production segment — as shown in the upper left quadrant of the preceding "Work-

> *The buyer's motivation for purchasing ad hoc workflow software comes from a sense that routine office work needs new tools for coordinating and tracking activities that involve multiple users.*

CURRENT STATUS OF WORKFLOW SOFTWARE IN SURVEYED COMPANIES

11.91%
2.60%
37.04%
43.45%

Installed
Product Selected
Investigating
Not Considering

Source: BIS Strategic Decisions

Information Systems departments make up a large percentage of the 37% of respondents who say they are not considering workflow software.

WORKFLOW IN ACTION:
Aetna Health Plans

Aetna Health Plans (AHP) processes approximately 80 million health insurance claims per year in 34 claims offices nationwide. Its use of workflow software in conjunction with document image management is an outstanding example of a document-centered production approach. AHP's implementation is based on software from ViewStar, a leading vendor of production workflow software packaged as part of a document management system.

Processing health claims is one of the most paper-intensive of all transactions, and one that typically involves the movement of documents among many individuals in an office. Customer service representatives, who answer questions for policyholders, require constant access to new and historical documents. Claims representatives must know that claims have been received, their current location, and their processing status from the minute they arrive in the mail room.

Before the implementation of workflow software at AHP, this information was unavailable until the claim processing was complete, up to nine days after the claim was received.

AHP's workflow starts in the mail room where the incoming claims are barcoded and scanned. The workflow software automatically imports barcoded information into the ViewStar database, logging the claim, assembling all the attached documents into a folder and generating a unique ID number before forwarding the information to an indexer.

The indexer retrieves work from a queue and enters claim data from the scanned images. After indexing, each folder is forwarded to a workflow server, which makes complex processing decisions based on instructions programmed in ViewStar's fourth-generation language script.

Software on the workflow server then does the following:

- confirms that each folder represents only one fami-

ly. If a folder mistakenly contains two claims in one, the workflow server will automatically split it apart.

- checks the claim data against mainframe-based eligibility files, routing the folder to an exception queue for research if necessary, or to a fax queue if the claim must be forwarded to another Aetna office.

- adds additional data to the folder from the policyholder file. This data may include group number, patient name, and codes to assist in claim processing or automatic generation of form letters.

- searches the system for other folders relating to the same family, merging them for processing.

- identifies "special handling" claims — for example, those with high dollar amounts — and routes them to priority queues for fast review.

- distributes validated claims to the appropriate work queue for adjudication and payment. Claims processors drawing work from these queues are presented with a customized Windows screen including a 3270 host window, an image window and a data form. They can key information into the host application from the images, place folders on hold pending additional documentation, or attach annotations and send the folder to a supervisor or analyst for further review.

Within nine months of initial implementation, AHP was enjoying a 25% reduction in claims processing time, a 15% reduction in the processing of invalid or duplicate claims, and a tremendous overall improvement in customer service. Based on 80 million claims per year, these benefits add up to millions of dollars in savings. In addition, customer service representatives now can access submitted claims within 24 hours of their arrival, instead of waiting nine days. Finally, AHP is able to increase market share based on its ability to process more claims.

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flow Software Market Segments" chart — is more mature. This segment is dominated by the image management vendors. Within it, the work process is document-driven, mostly by paper. Because of the high cost of processing transactions based on manual paper routing, the

combination of workflow software and imaging technology provides a particularly high return on investment within this segment.

In fact, the benefits of workflow automation often represent the key to payback on the overall document imaging investment, which is still

very expensive.

More than simply providing work routing, workflow software in this segment is increasingly concerned with automating complex processes involving multiple disparate computer applications. In fact, integrating information from

multiple sources is a workflow software feature that production workflow software vendors typically stress even more than automatic user-to-user routing.

Production workflow software allows work to be routed to shared processing queues.

This integration usually involves the automatic exchange of data between multiple applications simultaneously running in windows on a single user's desktop. A typical example includes a terminal emulation program running a mainframe application, a LAN-based document management system and a desktop word processing program.

Because the work is part of a production process, multiple users are often performing similar tasks. Production workflow software allows work to be routed to shared processing queues, from which it is dynamically distributed to the next available user in assembly-line fashion.

Saying that the work process is "document-driven" means that the particular set of tasks that is executed fits a standard pattern associated with a particular document type or set of documents. Examples include an application for credit, an invoice, or an insurance claim. Today, these transaction source documents are often paper, but they will increasingly be electronically generated.

Standardization and proliferation of Electronic Data Interchange (EDI) will force production workflow software products to embrace these new types of documents. This will also be the case with the growth of a host of new technologies connecting mobile sales, service and professional workers with central-

ized administrative processing centers. These technologies include pen computing, wireless networks and digital signature authorization via E-mail. The nature of the document may change but the process remains one of transaction automation.

Group-Centered Ad Hoc Workflow

The bottom right quadrant of the "Workflow Software Market Segments" chart represents a contrasting vision of workflow automation. Group-centered ad hoc workflow starts because a work process requires the coordination and the tracking of tasks performed by multiple individuals. Workflow consists of work routed from individual to individual. "Work" is a request to the user to perform some task or make a decision, e.g., "approve or reject this proposal."

WORKFLOW IN ACTION:
Consolidated Edison

Document-driven production workflow does not require imaging, although the imaging vendors today have the most mature tools to handle high volume transactions. In this example, an imaging workflow vendor, Sigma Imaging Systems, has used workflow software with ASCII text files, not images, to solve a major customer service headache for Consolidated Edison, New York City's electric power utility.

Con Edison of New York has 20 sites and 1,000 service representatives in its customer service organization. Each day meter readings are taken by field support staff throughout the New York metropolitan area. The readings are transferred to the central mainframe, which identifies inconsistencies and generates account investigation listings (AILs) for problem resolution. Approximately one million AILs are generated each year.

Prior to the implementation of workflow software, AILs were printed, manually sorted and delivered to customer service reps for follow-up. This process included thousands of pages per day. The reps were limited in their ability to respond promptly to customer inquiries because supporting documents were not at hand. As a result, much time and energy was required to retrieve filed (and misfiled) documents.

Using Sigma Imaging's OmniDesk software, Con Edison is able to load mainframe AIL data directly into OmniDesk forms. This data is automatically indexed and queued for workflow processing and distribution to customer service representatives.

Workflow routes are constructed to meet a wide variety of local needs, and can involve hundreds of routing rules. Because of the graphic nature of OmniDesk workflow tools, these routes can be defined by non-technical customer service managers; they do not require a programmer. Customer service reps now retrieve the AILs from their workflow inbox, and by accessing multiple windows on the workstation, can view the data, compare it with a mainframe-based account history, and resolve the problem. Con Edison anticipates it will save almost $2 million annually with this system.

PREFERRED WORKFLOW SOFTWARE PLATFORM

Source: BIS Strategic Decisions

The huge installed base of PC/LAN users is fertile ground for workflow software implementations.

In its simplest form, this type of workflow software exerts no control at all over external computer applications. It just routes messages embodying these requests for action or decisions, typically as part of an electronic form. Each user performing work indicates completion of the requested task or decision via a check box or action button on the electronic form.

This automatically forwards the work package to the next user defined in the workflow, possibly dependent on the specific action or decision indicated. Each user receiving the work package in succession may see a different version of the form, reflecting the particular work request and decision options defined by the workflow originator.

Such a baseline capability — delivering messages to users on a network — is already available to most networked computer users today in the form of E-mail. Adding workflow to this sequential forms routing process represents a major enhancement and will be provided within a year by most E-mail vendors, including Microsoft and Lotus.

Thus this form of workflow software will become nearly universal within two or three years as a basic E-mail function at little or no cost. As such, it will bring workflow capabilities to the mass market. And this E-mail-enabled workflow software will not be underpowered compared with standalone packages.

While the work may not generally be document-driven, documents, including images and annotations, can easily be included as E-mail attachments. In addition, software "agents," or background programs monitoring a user's mailbox for incoming messages, will be able to detect and filter arriving workflow

WORKFLOW IN ACTION:
Young and Rubicam

Although group-centered production workflow software is still in its infancy, there are a few intrepid users. A pioneering example can be found in the project traffic control system at Young & Rubicam, one of the nation's largest advertising agencies. The traffic control system is embodied in the internal client project management process, which involves a mass of paper forms and the need to coordinate the activities of many groups.

The process starts with a work order form created by the account executive. The work order is then copied and distributed to creative services, which prepares concepts and layouts. Layouts must be approved, distributed and filed. Cost estimates must be prepared by the art director, production manager and media planner. Client signoff is required. Final art must be prepared and approved by the client. Finally, supplier purchase orders must be created. In the traditional traffic process, all this work adds up to a paper nightmare.

Y&R's workflow application uses Action Technologies Inc.'s workflow companion product to Lotus Notes. Notes constitutes the document database environment for Action's unique workflow methodology. Action views every major activity within a workflow sequence as consisting of four steps: a request, an agreement, work completion and acknowledgement of satisfaction. The firm's methodology consists of analyzing workflows
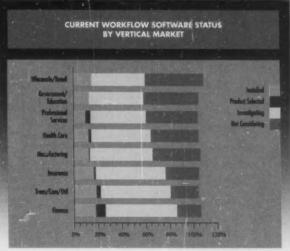
packages. They can then initiate certain desktop functions automatically. Deadlines for each work step can even be assigned, and alarm messages sent automatically if the work is late.

Such function provides significant task coordination with very little change to standard mail systems. By itself, however, it offers little in the way of control over the work process. It cannot answer basic questions like, "Where is the work now?," "What has been done to it?" and "What are the actions remaining?"

These kinds of questions require a central information repository or database that is updated by all the individual workflow processing events. Such a function is beyond standard E-mail capabilities. Nonetheless, a workflow tracking database will be a key component of specialized workflow software engines that allow the group-centered work model to deal with critical business problems.

CURRENT WORKFLOW SOFTWARE STATUS BY VERTICAL MARKET

Source: BIS Strategic Decisions

The most avid workflow software vertical industry groups include financial services, transportation, communications, utilities and insurance.

Group-Centered Production Workflow

The need to organize and track complex processes performed by workgroups leads to a grander vision of workflow, one in which coordinating human activities is as important as integrating computer applications. The group-centered production workflow quadrant, in the top right corner of the "Workflow Software Market Segments" chart represents that vision.

Here the processes are coordinated to obey a stable, but sometimes

and breaking them down into graphic "loops," each of which embodies this four-step cycle. Y&R's workflow application differs from those at Aetna and Con Edison in that it does not require integration of computer programs so much as the coordination of human work. Even so, assistance by Action's consultants was necessary to analyze and map the workflow. This analysis forced Y&R to apply a logical structure over a sometimes chaotic process. It also

identified bottlenecks and gray areas in the current process. As an extra benefit, the process also made Y&R clients more aware of their responsibilities.

While many users and managers were skeptical at first, the initial pilot, involving a single advertising client, has proven to be a great success. No formal cost payback data is available, but a very revealing survey of users before and after three months of the pilot shows that they believe they are working much

more efficiently.

For example, the percentage of users stating it takes too long to prepare a brief dropped from 71% to zero. Those saying it takes too long to file and sort documents fell from 50% to zero. Frequent duplication of effort fell from 42% to zero. Jobs finished on time with no rush rose from 32% to 52%. Jobs completed on budget rose from 73% to 87%. Y&R expects to roll out the Notes/Action workflow to other clients in the near future.

fuzzy, set of rules and procedures. This is clearly not an ad hoc environment. Examples of group-centered production workflow applications include processing purchase requisitions, resolving field service problems and even new product development. The goal in each case is a faster and smoother process achieved by coordinating the activities of multiple individuals or groups.

The ability to forward work to "roles" rather than named users is another production-level feature that goes beyond standard E-mail capabilities.

In contrast to those in the document-centered production segment, these processes are often measured in weeks rather than seconds or hours. They also do not require dynamic work distribution to functionally equivalent human processors. Consequently the group-centered production segment tends to rely on E-mail rather than a shared database connection as the basic link between workflow participants. It does, however, require more than basic E-mail capabilities.

For example, intelligent rules-based routing is required, as well as interfaces to exchange information with external applications on both the LAN and glass house hosts. The ability to forward work to "roles" rather than named users is another production-level feature that goes beyond standard E-mail capabilities. Administrative utilities that map users to a set of roles, or override the workflow route and move work from one queue to another, are also typical in this type of workflow software. But the most important differentiator is work tracking and reporting.

Document-Centered Ad Hoc Workflow

Finally, the fourth quadrant in the "Workflow Software Market Segments" chart, document-centered ad hoc workflow, comprises an unusual combination. As in the group-centered ad hoc segment, the work flows represent occasional processes, but processes revolving around the handling of external documents, either electronically generated or in the form of scanned images. Examples include managing correspondence and routing documents for comment or approval.

Products in this category provide tools that allow any user to initiate an ad hoc workflow closely integrated with a document management system. Such an arrangement, while less flexible in some ways, is useful if the workflow involves the sharing of significant document volumes, particularly images or other large object types.

The link to a document management system allows documents to be moved "by reference," i.e., without moving the physical file over the network.

At some point in the future, facilities for indexing and high-volume storage of large objects will be commonly found in network operating systems. A current example is Novell's Image Services for NetWare. When all network operating systems are thus endowed, E-mail vendors will be able to provide much of the function required for this segment.

Workflow Software and Reengineering

Because of the strong association of workflow software with "the business process," the implementation of workflow software often occurs in conjunction with a broader reengineering initiative. Business process reengineering involves analyzing how organizations do their work now, and how, with the right technology, they can be made more efficient.

While business process reengineering is a great help in maximizing the economic benefit of work-flow software, it is not required, and sometimes not even recommended, before the initial application of workflow technology. A lesson learned by the first generation of workflow users is that often the ultimate solution cannot be predicted by analysis alone; it has to evolve through experience. Today, users are increasingly getting their initiation with workflow software on a pilot basis, and then incrementally reengineering the business process as they go.

What Users Want: Products

Even though the workflow market is in its early stages of development, some user demands are already clear. For instance, most users are looking for workflow products that:

Allow them to get started quickly. If developing a workflow application requires months of study and massive program development as part of a monolithic reengineering effort, users will not commit. Experience has shown that an incremental approach, evolving from a quick pilot application and embracing a gradually increasing number of users and reengineered process functions, has a greater chance of success.

Allow them to modify and evolve the workflow themselves. Users know intuitively that the right workflow design will require their own experience, plus a certain amount of trial and error. They do not want workflow modification requests to add to the IS application backlog. Quick response is mandatory. For this reason, users are increasingly demanding graphic tools that allow non-programmers to modify, maintain and even develop workflow applications.

Handle real-world exceptions. Handling a fixed sequential process is easy; the payback from workflow comes from handling the exception cases. The old maxim that 80% of the time or cost is spent on 20% of the work applies here. That 20%

WORKFLOW IN ACTION:
British Petroleum Exploration

British Petroleum Exploration in Alaska has responded to regulatory and business requirements with Open ODMS, a workflow and document management system from Odesta Systems Corp. BP needed to manage its 200,000 engineering drawings in support of the company's North Slope activities. The combination of document management and workflow software was required to achieve an "evergreen" state of information currency, improve business performance and address regulatory requirements.

In Alaska, BP operates its production facilities well above the Arctic Circle, 800 miles north of its offices in Anchorage. A distributed, client-server approach was required to support the mission-critical engineering needs across such distances. Up to 200 staff members in both Anchorage and in the remote field facilities can now search, retrieve and view drawings and other documents from a Macintosh for review, analysis, change management and audit purposes.

Mark-up and edit tools allow the technicians, operators and engineering staff at all sites to comment on field conditions or suggest modifications graphically. The information can now be shared electronically across multiple engineering projects and geographically dispersed sites.

Workflow software is used in revising the original drawings, as well as for work package routing for the review, preparation and approval of drawing changes. While the primary process of revision control has already been streamlined, incremental process reengineering opportunities are surfacing as familiarization with the technology increases.

Benefits from the Open ODMS solution are expected to approach $2.5 million annually. And this figure is expected to increase significantly as the further potential of the technology for risk management and enterprise-wide workflow and document management is realized.

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represents the cases that require special handling. Workflow software products that allow complex branching based on identifying exception cases are already the norm, at least in the production workflow segments. What is new is that a user processing work in the middle of a workflow route can perform two tasks: note an exception condition totally unanticipated by the workflow application developer, and add some processing steps on the spot. The use of object-oriented technology in workflow software is a key part of this development.

What Users Want: Services

Beyond workflow automation products, users are also looking for professional services to help them analyze their existing processes and reengineer them. Here, too, they are looking for basic essentials such as:

Proven experience. Many computer vendors are rapidly expanding their service businesses as hardware margins shrink, but not all have the process redesign or analysis experience to back it up. Users want to see evidence of past success, preferably in a similar industry or application.

Reduced investment risk. Users are willing to spend money on workflow analysis and design services when these products reduce, rather than increase, the risk of a bad technology investment. Gone are the days when users readily accepted a $200,000 design study for a $350,000 investment. If there is risk, users want the service provider to share it, and perhaps provide incremental services to go along with a gradual workflow implementation.

Use of a standard methodology. Process redesign and application development services that make use of a standard methodology give the workflow software vendor strong credibility with users. It usually means better trained consultants

who can draw on experience gained through the repetitive use of a standard methodology. Users want a methodology that employs a software tool to model the workflow, simulate how it would work, identify the bottlenecks it is likely to encounter and generate the actual workflow software.

Involvement in the reengineering process. Many users have a justifiable fear of being shut out of a process reengineering effort led by an outside vendor or even internal IS staff. The users have to live with the end result so they want to be part of the process. The most successful implementations of workflow analysis and development projects heavily involve users, IS and the vendor or vendors.

Workflow Market Profile

BIS Strategic Decisions, in conjunction with *Computerworld*, recently conducted a survey of 600

U.S. users to determine the current profile of the workflow software market and to project future trends. The respondents represent purchasing decision-makers spread across a wide spectrum of industries and company sizes. Two-thirds of the respondents come from IS; the rest come from a line of business. Acceptance of workflow software technology is already high. A healthy 11.9% of all respondents have installed a workflow application, and another 2.6% say they have selected a product, but have not yet installed it. Acceptance is especially strong for the line-of-business users. Over 19% of them have installed or selected a workflow product, compared with only 12% of the IS respondents.

In addition, 48% of all respondents are investigating the need for workflow. Only 37% are not considering the adoption of workflow automation at this time, because IS appears more inclined to reject the technology.

The following vertical industry groups are particularly bullish on workflow: financial services, transportation, communications, utilities and insurance. On the other hand, wholesale/retail, government, education and professional services are more conservative in their workflow adoption plans.

Overall, respondents rate today's need for workflow software in general office processes equal to the need for workflow systems in line-of-business applications. Today's workflow market, however, is predominantly concerned with production applications in line-of-business processing. Counting only those respondents with workflow applications installed, workflow automation of line-of-business applications is more important than workflow automation for office applications.

In particular, respondents interested in document imaging rate the importance of workflow technology for line-of-business applications higher than they do for office or ad hoc processes. Line-of-business workflow processing is also rated higher by those favoring the following large system workflow platforms: mainframes, minicomputers and Unix client-servers.
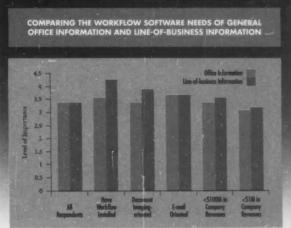
LOB Importance

Line-of-business workflow applications are viewed as significantly more important than office workflow opportunities in certain vertical industries, as well. These include banking and finance, insurance, transportation, communications and utilities. By way of contrast, wholesale/retail, education and government users consider office workflow software to be more important.

Line-of-business processing covers a mix of production and ad hoc functions, but tends to be more production-oriented. For instance, workflow procedures for line-of-business applications are viewed by most survey respondents as structured and relatively static. This view is especially strong among imaging users, a fact that reinforces the perceived strong connection between document imaging and "paper mill" industries with production workflow software.

The need for workflow software in line-of-business applications is higher within the largest companies with over $100 million in revenues than it is in smaller ones with under $1 million in revenues. On the other hand, office automation workflow software is rated equally important by respondents in all company sizes except for those with under $1 million in annual revenues.

Surprisingly, over the next three years, respondents foresee a stronger rise in the importance of line-of-business workflow than they do for office workflow. This is surprising because the technology for production workflow automation software

COMPARING THE WORKFLOW SOFTWARE NEEDS OF GENERAL OFFICE INFORMATION AND LINE-OF-BUSINESS INFORMATION

Source: BIS Strategic Decisions

When counting only those respondents with workflow software installed, workflow automation of line-of-business applications is viewed as significantly more important than office applications.

EUROPEAN WORKFLOW SOFTWARE ACCEPTANCE

26%   20%

Have Workflow
Considering Workflow
Not Considering Workflow

54%

Source: BIS Strategic Decisions

Twenty percent of all European survey respondents have installed or selected a workflow product.

in line-of-business applications is more mature and better established than is ad hoc office workflow software technology.

Of course, the proof is in the actual adoption plans. The adoption rate as measured by respondent plans for an initial pilot within one year favors line-of-business workflow software over office workflow software by a two-to-one margin (43% to 23%). Within three years, however, the adoption of office-based workflow automation will occur in nearly as many companies as line-of-business-based workflow (69% vs. 78%). Overall, the adoption rate of workflow technology for office automation appears to be about one year behind that of line-of-business applications.

Based on survey results, users are more optimistic than IS about initial adoption plans for both types of workflow software applications during the next 12 months. However, looking out two years or more, both users and IS predict the same rate of initial workflow adoption. As might be expected, large companies are planning much more aggressive im-

plementation schedules for workflow systems than are smaller ones.

Who are the likely users of workflow technology? Overall, respondents view the importance of workflow software for clerical workers slightly higher than they do for professional workers or management. Within three years, however, they say the importance of workflow systems will increase to all three groups, but still more so for clerical workers.

Survey respondents clearly pick PC LAN client-server as the currently preferred workflow platform. And that preference will only strengthen. Overall, 55% pick PC LAN as their current workflow platform, compared with 44% for the desktop, 24% for minicomputer, 18% for Unix client-server and 17% for mainframe.

The survey clearly shows that users view workflow software application development as a responsibility of customer organizations, not vendors. Overall, 64% of respondents look to their IS organizations as a primary source of workflow applications while 24% view

line-of-business end users as primary workflow developers. System integrators are next (20%), with workflow software vendors (14%) and independent software vendors (12%) trailing.

Respondents also indicate a strong preference for the incremental reengineering approach. Asked to rate four approaches to reengineering on a five-point scale, respondents clearly favor a combination of gradual reengineering after implementing an initial workflow software application. The second preference is for a complete reengineering before initial implementation.

Workflow Software: Business Tool for the '90s

The workflow software vendors are responding to user demands for this technology with an increasing number of product and service offerings in all segments of the market. Even products that bridge the production-ad hoc divide are emerging, as established workflow software vendors seek to broaden their markets. Interest among users is high, but they are asking for robust tools they can use themselves.

Major PC software vendors are just now getting into the arena, and this will greatly advance the education of the mass market, creating additional opportunities for small workflow software specialists. Because an incredibly wide spectrum of price expectations still exists, all vendors face a period of market education. They can only expect slow movement toward accepted price/value relationships for specific workflow software functions.

One thing is certain, however: The economic pressures to increase the productivity of office work, in combination with the nearly universal networking of powerful multi-windowing desktop computers, makes the future growth of workflow automation software a sure thing.

IBM's ThinkPad tops user ratings in competitive notebook market

IBM's ThinkPad 700C

OVERALL SCORE: 79

9.4	Software compatibility
8.8	Screen readability
8.7	Overall reliability
8.0	Durability
7.7	Value for the dollar
7.5	Vendor service
7.2	Quality of support

Would you buy the product again?

32 — LIKELY
REASON:
Quality product

RESPONSE BASE: 32 USERS

Compaq's LTE Lite 425C

OVERALL SCORE: 75

9.4	Software compatibility
8.2	Overall reliability
7.5	Durability
7.5	Screen readability
7.5	Quality of support
7.0	Vendor service
6.7	Value for the dollar

Would you buy the product again?

33 — LIKELY
REASON:
Good price/
performance,
quality
product

7 — UNLIKELY
REASON:
Better systems
available

RESPONSE BASE: 40 USERS

By Kevin Burden

The notebook market has become a battle royal — roughly 100 vendors are now fighting for their share of the spoils. Market research firm Frost & Sullivan, Inc. said it expects notebook sales to make a sizable 24% increase this year to 2.7 million units.

In the Buyers' Scorecard survey on color notebook computers, IBM ThinkPad 700C came in as the leader in the user satisfaction ratings with an overall score of 79. Both Toshiba America Information Systems, Inc.'s T4400C and T4500C SX and Compaq Computer Corp.'s LTE Lite 425C systems took second-place honors, achieving scores of 75, followed by AST Research, Inc.'s Power Exec 425SL at 74.

IBM's ThinkPad has been available for less than a year and should continue to build market momentum. The ThinkPad's color display and battery life topped the other systems in user satisfaction. Users also seemed to be taken with its joystick cursor control and its docking station capabilities. But the lack of a Personal Computer Memory Card International Association card in the 700 and its early obsolescence by the introduction of the 720 had many users wishing they had delayed their purchase plans a few months.

Unlike its competitors, Toshiba has ignored the desktop PC market to concentrate solely on portables. The company has managed to maintain at least 20% of the market for several years. Its T4400C and T4500C notebooks were awarded high scores for screen clarity and readability. However, many users said they would prefer a larger display.

Toshiba's systems also scored high in durability, equaling the ThinkPad in that category.

While Compaq's brand name and reputation can lure potential buyers, the quality of its support can be enough to land them. Respondents said Compaq's service and support for the LTE Lite 425C has lived up to the company's reputation; the Compaq product earned high satisfaction marks in these areas.

The LTE fared well in many areas. If the model has an Achilles' heel, it is its battery life. Users gave it the lowest rating among the four rivals for battery life, a crucial notebook feature which on this model can be monitored on a gauge.

AST's Power Exec is priced to attract users, and its power and performance helped it to the highest satisfaction ratings in value for the dollar. However, it scored below the other systems in overall reliability.

Buyers' Scorecard records users' satisfaction with their installed technologies. Users assigned 1-to-10 ratings based on their satisfaction with their notebook computers in 20 specific categories.

All categories were factored into the final scores. The scores for each product in the seven most important categories are listed in the charts. ■

Toshiba's T4500C, T4400C

OVERALL SCORE: 75

9.1	Software compatibility
8.3	Overall reliability
8.0	Durability
7.6	Screen readability
7.4	Value for the dollar
7.3	Quality of support
6.9	Vendor service

Would you buy the product again?

37 — LIKELY
REASON:
Dependability,
durability,
quality

2 — UNLIKELY
REASON:
Screen is
too small

RESPONSE BASE: 39 USERS

AST's Power Exec 425SL

OVERALL SCORE: 74

9.1	Software compatibility
7.9	Overall reliability
7.9	Value for the dollar
7.5	Durability
7.1	Screen readability
7.0	Vendor service
7.0	Quality of support

Would you buy the product again?

27 — LIKELY
REASON:
Reliability,
durability

3 — UNLIKELY
REASON:
Problems with
battery life, poor
service

RESPONSE BASE: 30 USERS

METHODOLOGY

User names were obtained from nonvendor sources. First Market Research Corp., an independent market research company in Austin, Texas, conducted the survey and tabulated the results. The response base was 141.
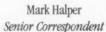
Users rated their satisfaction with their installed products and were not asked to compare or rate one product directly against another in the Scorecard.

To compute the overall score for each product, we performed the following steps: 1) Multiply the product's score in the first category by the user importance rating for that category to obtain the weighted score. 2) Repeat the process for all remaining categories. 3) Average the resulting figures for the average weighted score. 4) Convert the average weighted score to base 100; the ratio of the average weighted score to the average user importance is equal to the ratio of the overall score to 10. Numbers are rounded off where necessary.

Computerworld thanks the following individuals and firms for their assistance in preparing this Buyers' Scorecard: *Computerworld* Database Division; Janet Cole, Dataquest, Inc.; Richard Zwetchkenbaum, International Data Corp.

Apple's PowerBook 180:
Easy-to-use notebook a hit, although short battery life frustrates users

PowerBook 180

Computerworld's Firing Line is an evaluation based on interviews with major users at corporate and educational installations. The product under evaluation is being used in live application environments.

■ The high-end Apple Computer, Inc. PowerBook 180 is lauded by evaluators because it is easily configured, easy to support and popular with users.

■ Evaluators also said the PowerBook needs a longer battery life and is a bit more expensive than DOS-based systems.

Firing Line evaluators included senior information systems managers from a major metropolitan university, an entertainment agency, a computer hardware manufacturer and an international business consulting firm.

The evaluators managed the acquisition and support of more than 1,700 Macintosh PowerBooks, more than half of which were PowerBook 180s. The remaining mix included PowerBook Models 140, 170 and 165C. In addition, a small number of PowerBook Duos were deployed by these managers.

The applications installed on these systems generally included a suite of Microsoft Corp. programs, including Word and Excel. Other systems were equipped with the less powerful (but perhaps more versatile) Microsoft Works or Claris Corp.'s ClarisWorks.

All PowerBook models were also equipped with custom software that varied among the sites. For the most part, this software was designed with databases and/or telecommunications in mind.

This evaluation was prepared with the aid of Pieter Hartsook, editor and publisher of "The Hartsook Letter" in Alameda, Calif.

Reliability
Notebook computers generally suffer more pounding and thrashing than do desktop systems. The rigors of travel — whether across town or across the ocean — generally mandate that notebooks be of reliable construction and sound durability. As our manufacturing evaluator said, "Notebooks, in general, are more likely to be abused than desktop systems. So reliability makes more of a difference."

Although the PowerBook 180 did not survive an accidental "baseball bat test" that the consulting evaluator witnessed, all evaluators agreed that the PowerBook line has become increasingly durable and reliable during the last year. The 3.7 rating reflected problematic quality control during initial manufacture of the PowerBook line.

Consultant: "Other than people dropping the units, we haven't had too many problems."

Entertainment firm: "Someone took one to the beach and got sand in the disk drive and keyboard."

University: "Poor-quality DOS and Windows notebooks have a higher failure rate."

Compatibility
Compatibility with existing Macintosh software did not seem to cause a problem for any of the evaluators. With only minor exceptions, both off-the-shelf and in-house applications seemed to run flawlessly on the PowerBook 180.

Where compatibility was a problem, it was attributed to Apple's System 7.1 operating system rather than to the PowerBook 180. The consulting evaluator said some in-house applications were undergoing slight revision to remedy display problems.

Consultant: "We had a few problems related to System 7.1."

Manufacturer: "We didn't run into any surprises, and our software suite ran as expected."

Performance
With a 33-MHz 68030 processor, the PowerBook 180 is equivalent in power and performance to some of Apple's desktop systems. But the notebook drew only average reviews for an entirely different reason.

Although they considered the PowerBook 180 to be an able per-

former on the road and the desktop, the evaluators said they were concerned about the short battery life of 45 to 90 minutes. That criticism came from all of the evaluators, who said it reflected the opinions of PowerBook users.

Consultant: "Battery life is minimal."

Entertainment firm: Our users say "it should get you from L.A. to New York on one battery."

Technical support
In most cases, the evaluators said the PowerBook 180 required substantially less technical support than DOS and Windows notebook systems. Indeed, they claimed PowerBook 180 users rarely used the system manuals, and Apple's built-in networking support — Apple Remote Access — made telecommunications and network access far easier than with any other system.

The manufacturing and enter-

Apple's PowerBook 180

Ratings are based on user expectations on a 1-to-5 scale, where 1 is below expectations and 5 is above expectations. Ratings are presented in order of importance to users.

Rating	Score
Overall rating	3.9
Reliability	3.7
Compatibility	4.7
Performance	3.0
Technical support	3.7
Ease of installation	4.3
Support costs	3.7
Ease of use	4.3
Range of services	4.0
Documentation	3.7
Price	3.0
Value	4.3
Telecomputing usefulness	4.7

RATINGS

Installation descriptions for users who evaluated Apple's PowerBook 180

SITE PROFILES

	Consulting firm	Entertainment firm	University	Computer hardware firm
Using PowerBooks since	1992	1992	1991	1991
Number of PowerBooks in use	1,000+	200+	200+	300+
Standard configuration	8M BYTES RAM, 120M-BYTE HARD DISK, 14.4K-BYTE MODEM	8M-16M BYTES RAM, 120M-BYTE HARD DISK, 14.4K-BYTE MODEM	8M BYTES RAM, 120M-BYTE HARD DISK, 9.6K BIT/SEC. MODEM	8M-16M BYTES RAM, 120M-BYTE HARD DISK, 14.4K-BYTE MODEM
Primary use	ON-SITE CONSULTING	CLIENT TRACKING, EIS	ACADEMIC	SALES SUPPORT, CUSTOMER SERVICE
Desktop environment	60% MACINTOSH, 40% DOS/WINDOWS	80% MACINTOSH, 20% DOS/WINDOWS	45% MACINTOSH, 55% DOS/WINDOWS	15% MACINTOSH, 75% DOS/WINDOWS, 10% UNIX

Evaluators said the PowerBooks
have become more durable and reliable in the past year

tainment evaluators said Apple provided excellent technical support and repair services when required.

Entertainment firm: "Questions are typically, 'How do I send a fax?' The vast majority [of our technical support] is fax-related."

Manufacturer: "I have one person manning the PowerBook help desk. That's less than we expected."

Apple's PowerBook 180C *is a new, color version of the unit discussed in this evaluation*

Ease of installation
Like other systems in the PowerBook line, the 180 includes built-in support for networking using the AppleTalk protocol. An AppleTalk port is included on all PowerBooks. In addition, a Small Computer Systems Interface (SCSI) port allows connection of the PowerBook to peripherals usually related to desktop systems, such as CD-ROM drives, tape backup devices and the like.

The evaluators said that using these devices posed few problems.

Support for extra hardware devices is included either in Apple's System 7.x operating system or in easily configured programs delivered by hardware vendors.

Entertainment firm: "What impressed me was the multiprotocol support. Configuring it was a dream."

University: "A pleasant surprise was configuring Macs using a SCSI Ethernet adapter."

Manufacturer: "We chose [the PowerBook] because of the installation relative to Windows."

Support costs
Because the PowerBook 180 runs the same software as all other Macintosh models, evaluators said support costs were distinctly lower than that of equivalent DOS and Windows systems. They attributed other support reductions to the intuitive Macintosh user interface, which they said was easier to use than Windows.

University: "There are less support costs in the PowerBook than in DOS notebooks."

Manufacturer: Support costs might go up "because most PowerBook users are sales reps. They need more support than engineers."

Ease of use
The evaluators agreed that the PowerBook 180 could easily be adopted by novice users.

They said the Macintosh interface insulated users from operating system arcania and was fairly consistent across applications.

Entertainment firm: "It takes about half an hour to get a user up and running. That's about a 10-to-1 ratio" compared with others.

University: "You get more from PowerBooks than from other notebooks."

Range of services
The PowerBook 180 includes a wealth of options not found on most DOS and Windows notebook systems. These include a built-in SCSI port for connection to external devices, a built-in AppleTalk networking port and a pointing device that is embedded in the keyboard.

Entertainment firm: "Everything is built-in: a SCSI port, networking and a mouse."

Documentation
The evaluators had little to say about PowerBook documentation, primarily because users had little need for it. They did say the "balloon Help" facilities included in the System 7.x operating system vastly reduced the need for printed documentation. They said Apple's on-line Help was generally sufficient for most users.

Entertainment firm: "Our agents don't want [documentation]. They don't want anything to do with it."

University: "Most PowerBook owners don't read the manual."

Price
At a list price of $3,699 when equipped with 4M

PowerBook 180 features

- Includes 33-MHz 68030 processor and 68882 floating-point math coprocessor.
- Back-lit, active-matrix display with 16-level gray scale.
- Priced at $3,699 with 4M bytes of RAM and 80M-byte hard disk.
- Announced October 1992.

FACTS FACTS

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bytes of random-access memory and an 80M-byte hard disk, the PowerBook 180 is quite a bit more expensive than Intel Corp. i486-based notebooks.

The evaluators responded to PowerBook pricing with only average ratings.

University: "It's in the ballpark."

Manufacturer: "You pay a premium for the Power-Book."

Value
Despite the higher cost of ownership, the evaluators said the PowerBook provided more value than equivalent DOS and Windows systems. They cited lower support and training costs as justification for the higher PowerBook cost.

Entertainment firm: "I have fewer calls to the help desk. Configuration, training and support are less. I can have fewer technical people."

Telecomputing usefulness
The evaluators said the PowerBook 180 was a telecomputer's dream. They said few, if any, problems occurred with even the most novice telecomputers. They said the biggest telecomputing problem was finding and using hotel room telephone jacks.

Entertainment firm: "Our agents love it, but the irony is that the quality of [a third-party] fax has sold more PowerBooks than anything else."

University: "The remote networking [support] is very useful. That is not being done with DOS laptops."

Manufacturer: "Apple Remote Access and AppleTalk give the ability to dial in and have network services. You don't lose any functionality" over a desktop system.

Written by senior editor Garry Ray.

Apple responds

The following are Apple's responses to issues raised in this evaluation:

▶ **Battery life:** For all computer users, battery life is clearly a top priority. With this in mind, we have constantly evolved our battery technology since the introduction of the PowerBooks. We have moved from 2.5 amp/hour to 2.9 amp/hour batteries and have developed the EverWatch battery-saving technology. We continue to explore new possibilities for further improvements.

▶ **Pricing:** There have been some very aggressive pricing moves from the PowerBook group this month. We lowered the price of the entry-level model by 25% and the price of the PowerBook 180. In addition, the PowerBooks come with many features that are

not standard on the DOS platform: networking, audio, QuickTime and file sharing. Customers are buying a very complete portable solution and know they will not have to invest in new features at extra cost.

▶ **Color displays:** We introduced the passive-matrix color PowerBook 165C earlier this year. While the 165C has been doing well, it was clear that a portion of our customers were interested only in active-matrix color technology. The active-matrix PowerBook 180C was introduced June 7, so we now have a strong offering for all Power-Book customers.

▶ **Availability:** PowerBook demand has been tremendous. 400,000 were sold in the first year. While we anticipated strong demand, this level of success is unusual for a new product. As a consequence of high demand, we have made changes to our manufacturing cycle for PowerBooks to improve availability.

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RE-ENGINEERING ▸REPERCUSSIONS

Business managers, end users and IS staff from Connecticut Mutual, Agway and Kodak speak candidly about how re-engineering has affected their jobs — and their lives

CONNECTICUT MUTUAL

▶ **Re-engineering can create** *massive upheaval for a firm, say Connecticut Mutual IS chief Jan Scites (left), end user Kathleen Pogg (center) and business manager Karen Wetherell*

THE PROJECT

By Julia King
Special to CW

Two and a half years ago, paper plastered the desks of the 1,900 employees at the home office of Connecticut Mutual Life Insurance Co. in Hartford. A task as seemingly straight-forward as a beneficiary change required no fewer than 22 human interventions. Assuming no one lost the paperwork or misfiled copies, the process took up to six days.

Today, the same task is accomplished in two steps and in seconds, thanks to a multi-million-dollar re-engineering initiative aimed at moving all Connecticut Mutual divisions to a common computing architecture known as One Image.

Since January 1991, the One Image project has involved redesigning work flow across all departments, implementing imaging technology enterprisewide and furnishing all workers with "command centers" — network-based PCs that can access a single database of cus-
Connecticut Mutual, *page 150*

JITTERS

Re-engineering might have its benefits, but a survey of top-level managers at 200 companies found that some are wary

20% say maintaining re-engineering vision is a challenge.

40% of manufacturering execs knew change would be needed, but only

23% were confident their firms knew how to manage change.

80% of service company execs knew change would be needed, but only

50% were confident their firms knew how to manage change.

Source: Price Waterhouse, Philadelphia

Connecticut Mutual

tomer information.

Another key element of the $12 billion company's One Image program was the replacement of the traditional management hierarchy with cross-functional teams of workers. These groups are responsible for streamlining old business practices or architecting new ones. Included on these teams are application developers and other information systems personnel who report not to a central IS organization or chief information officer but to a division vice president.

So far, re-engineering has yielded productivity gains of 20% to 60% across all departments in the company's individual life insurance division. Additionally, the division has recouped its $5 million capital investment in the One Image project in 18 months — six months ahead of schedule.

Achieving these gains meant significant cultural changes for IS workers. First, application developers and programmers were reassigned to newly created "designer," "architect" and "navigator" positions. These new titles reflected what was expected of IS workers in the re-engineered organization, says Jan Scites, senior vice president and functional IS chief at the company's individual life division.

"As we get more into object-oriented and reusable code, the skill of raw coding is less necessary. [IS workers] need the ability to be intuitive, think spatially and navigate data to end users," Scites explains.

Creating cross-functional teams in which all members have an equal say in how to accomplish work is one of Scites' biggest challenges, she says.

"At the beginning, there was tension and a clinging to hierarchy," she recalls. "We came in and said, 'We're going to re-engineer the whole individual life line, and we need your support.' Because it was uncertain what all of that meant, even to us, people were afraid. We were all afraid."

Open communication and ongoing training programs were instituted to help combat the fear. In 1991, the division provided the employees with 15,000 hours of training in Windows, PCs and imaging. Last year, the figure rose to 25,000 hours.

Other communication activities included regular newsletters, informational videos and company-sponsored technology days when workers could experiment with different hardware and software.

On the positive side, Scites says the challenges associated with the re-engineering program "have energized and excited people as much as they have ever been in their careers."

Staffers feel good about their part in helping the company's 1.5 million policyholders. IS centralized policyholder information to eliminate redundancies.

Customer service consultant Kathleen Pogg used to spend a good deal of her working day rifling through file cabinets, only to find incomplete paperwork. "I don't know" was her honest answer to many questions Connecticut Mutual agents and policyholders called to ask. Her desk was "a mountain of paper, a real mess," she says. A backlog of three, four and even five weeks was common.

Today, the paper is gone. Pogg now has electronic access to all policy data as well as to legal documents, letters and other correspondence. Upon arrival in the company's mailroom, those paper documents are scanned into a corporate database. Looking at her screen, Pogg can see, among other things, who in her department or in another part of the company has worked on a customer file.

All of this has made her work easier. It has also done wonders for her mental health.

"It feels good to go home at the end of the day knowing that I got a lot done," Pogg says. "I'm a lot less stressed out. I'm not going from drawer to drawer or desk to desk to find something all the time. I can do all my work myself, and I know everything I need is right there in my command center."

RE-ENGINEERING'S IMPACT AT CONNECTICUT MUTUAL

GOOD	BAD
Single customer database	Tension and clinging to hierarchy
Flatter organization, teams	Fear of change
20% to 60% productivity gains	Anxiety over possible job loss
Energized staff	

Eliminating positions and dealing with widespread worker anxiety over losing jobs was the toughest challenge Customer Service Vice President Karen Wetherell faced. "It's difficult to implement change and ask people to be enthusiastic about it when they are anxious about losing their jobs," she says.

Wetherell's staff has decreased from 250 people in October 1990 to 184 today. While attrition accounts for a portion of that drop, other employees were put out of work by imaging technology and re-engineered work flow.

As the company restructured jobs, Wetherell says, she found that the best way to approach colleagues was directly.

"If we planned to convert files to optical disc, we would tell file clerks before we went in that their jobs would be gone in six months," she says. "By doing that, we developed trust. Employees knew they wouldn't be taken by surprise. They were thankful to us because they could prepare and seek other employment."

Personnel cuts, along with a 665-sq-ft reduction in office space and the elimination of 110 five-drawer file cabinets and costly color-coded paper forms, have made it much easier to bring her department in on budget, Wetherell says.

At the same time, the combination of new technology and re-engineered work flow has boosted productivity 35%.

"Problems are now resolved in one phone call rather than pending for weeks," she says. ■

AGWAY

For years, farmers placed orders at any one of 600 Agway, Inc. stores, which in turn submitted them to the appropriate mill, plant or warehouse. The result: an endless paper flow among Agway's retail, manufacturing and distribution facilities. These sites were ordering from and billing one another, all to serve the same customers.

Agway executives decided to consolidate the number of ordering points to 15. Now, rather than going to the stores, farmers call (800) GO-AGWAY to order all feed, crop and seed supplies directly from regional service centers.

Using an interim computer system that builds on the point-of-sale system used in the retail stores, customer service specialists have PC- and terminal-based access to customer histories, credit information and other data stored both locally at the service centers and on the cooperative's Amdahl Corp. mainframe.

The company opened its first regional customer service center last October. Four others will be operational by mid-summer.

While phone surveys of 80 farmers each week indicate a high level of customer satisfaction with the new ordering scheme, the systems supporting it are inefficient. This remains one of the IS department's chief re-engineering hurdles, says IS chief Carleton Whittemore.

From a business perspective, Agway knew it had to move ahead with its re-engineering plans to stem two straight years of declining revenue, he says. But this required moving to the regional service center concept before the IS group could develop and put in place new systems and tools.

"It took a lot of creative magic on the part of IS people, who have worked long, long hours to tie together a system from the consumer group and two other systems from the agricultural group. But what we have is a conglomeration of existing systems that are far from efficient," he explains.

Meanwhile, the IS department is being overwhelmed by demands from other Agway business units. Agway's consumer and energy divisions are also re-engineering. Also, the cooperative is looking to replace separate financial and control systems with one accounting system.

At the same time, the 125-person IS department is going through a sort of culture shock as it makes the transition from a separate Agway profit center to an internal support organization.

"IS has a tremendous amount on its plate," Whittemore says.

But there are positive results of the restructuring. "IS people are not always on the defensive, having to justify why something is late. They are starting to be looked at as part of a team."

▶ **Anne Doe** *misses face-to-face contact*

KODAK

THE PROJECT

In 1988, Eastman Kodak Co. set a company record by rolling out the world's first disposable 35mm camera just 38 weeks after the start of design work. Known as the Fling, the camera was the first Kodak product designed and manufactured by a project team employing concurrent engineering principles; three-dimensional, solid-model computer-aided design (CAD) technology; and a single database of development information — the three basic ingredients of a re-engineering effort that has now spread throughout the entire Consumer Products Division.

Prior to Fling, the company produced cameras and other Kodak products in a sequential, step-by-step manner from design to tool maker to factory floor. When problems surfaced, backtracking would begin.

Earlier this year, Kodak introduced the Cameo, a pocket-size, motor-driven 35mm fixed-focus camera. It is the 10th in a series of products developed since the re-engineering program began five years ago. From design to manufacture, it took 22 people 23 months to produce.

Prior to re-engineering, the same product would have taken more than 60 people between three and four years to get out the door.

IS VIEW

WOODY NOXON

Director, systems engineering division

"The power of the team becomes very strong."

The single greatest advantage re-engineering has afforded Kodak engineers is a consistent source of information, which enables each person involved in a project to know precisely how his work impacts others on the team, according to Woody Noxon, director of the Systems Engineering Division and manager of CAD technology.

"In the serial engineering process, designs would be thrown over the wall to the next department, and if there was a change, it had to go back over the wall the other way," Noxon explains. "But now that CAD tools and all the information around a product is available to anybody on the design team, people in different locations can use the same geometry at the same time, and they all know the relationship between the parts and the overall product."

The effect, Noxon says, has been that each person's work is available to everyone on a daily basis. "The power of the team becomes very strong very quickly and comes together around a common goal," he says.

END-USER VIEW

JOHN SPENCER

Design engineer

"We just don't make the mistakes we used to."

John Spencer, a Kodak design engineer and project manager on the Cameo, draws a sharp contrast between life before and after Kodak re-engineered around CAD and concurrent design principles.

"Before, we'd be blister-packing cameras and still changing features," Spencer recalls. "Now, we put a lot more thought into the process up front. There are 196 parts to the Cameo, and with the very first parts I put together, I built a camera that worked. That was unheard of five years ago. Now, we just don't make the mistakes we used to."

Learning to "trust the technology" took some time, however.

"CAD is not like a drawing board where you can look through vellum and see what you've got," Spencer says. "At first, especially in manufacturing, there was a lot of intimidation because there were no 'drawings' and no signing off on drawings. Instead, manufacturing had to go into the database to do their tooling

RE-ENGINEERING'S IMPACT AT KODAK

GOOD	BAD
Teamwork	Technology intimidating
CAD	Tough transition for more senior designers
Single design database available to all	
No finger-pointing	

estimates."

In this sense, Spencer says, the technology has placed an additional burden on designers to be good at technology as well as design.

One of the things Spencer doesn't miss at all about the old way of doing things is the finger-pointing that went on between departments. "Now, it is the team that succeeds or fails."

BUSINESS MANAGER VIEW

RAY LIMOGES

Engineering unit manager

"It was a difficult transition."

As Ray Limoges sees it, it is universal access to a single database that represents the largest engineering breakthrough at Kodak. Limoges, engineering unit manager, has furnished all 270 of his staffers with CAD terminals with links to both model and tool shops at Kodak.

"You get better designs with CAD, and the dramatic success of our new products has made people anxious to get on to the next project," he notes.

But it wasn't always that way. "We had a lot of people that had spent their whole career at the drawing board, and it was a difficult transition for some to throw away their boards," Limoges says.

Younger people, meanwhile, adapted much more quickly to the technology, but they lacked design experience.

The solution? Team younger designers with senior staffers, who, Limoges says, generally took about six months to get acclimated to the CAD system.

"We did have to take delivery pressures off senior people in the early stages," Limoges notes. "But when they saw their designs directly transitioned into parts, they became convinced of the value [of CAD]." ∎

END-USER VIEW

ANNE DOE

Customer service representative

"We need more training."

Agway's customer service staff members are primarily retrained employees from other parts of the company. Anne Doe, a customer service representative, used to be a store clerk. She says she likes her new job but misses being outdoors, especially during the Vermont spring.

Last year at this time, Doe was loading and unloading trucks, waiting on customers and "doing a little bit of everything" at Agway's farm center store in St. Albans, Vt., she says.

Today, Doe, who is herself a farmer, still works in St. Albans but at Agway's regional service center. There, she sits at a desk in front of a computer terminal, processing phone orders from farmers. "Being inside all year around is about the only thing that really bugs me," she says of her new job.

Because the computer system provides her with previously unavailable background information, such as the kind of feed bought in the

▶ Richard Stowe: *Changing attitudes was hard*

past, herd size and even the farmer's spouse's name, Doe says she has been able to more knowledgeably serve customers.

But like Whittemore, she says the computer system supporting the regional centers is inadequate.

"We need more storage because now we can only go back to the previous five orders. But for some of the big farms, five orders represents only a week's time.

"We also need more training," Doe adds. "We have a mainframe system, but as they add new programs, we don't get training. It's kind of hunt and peck."

BUSINESS MANAGER VIEW

RICHARD STOWE

Region manager

"We're more competitive."

Listing the benefits of re-engineering comes easy to Richard Stowe, who, as region manager for Agway's feed business, also oversees the St. Albans customer service hub. "The No. 1 benefit is that we've made it easier for customers to do business with us. Farmers can call and talk with essentially the same people every time," Stowe says.

"We're also more competitive and more responsive to customers' needs. Instead of going through one, two or three people to find an answer to a billing problem, each employee is responsible for resolving questions that come to them. Before, a complaint could take several days to weeks to resolve," he notes.

But changing employees' attitudes has been a problem, Stowe says. "They want to know why we're doing it a new way. It is difficult for employees to understand the need for and the rationale for change." ∎

RE-ENGINEERING'S IMPACT AT AGWAY

GOOD	BAD
Consolidation	Inefficient systems
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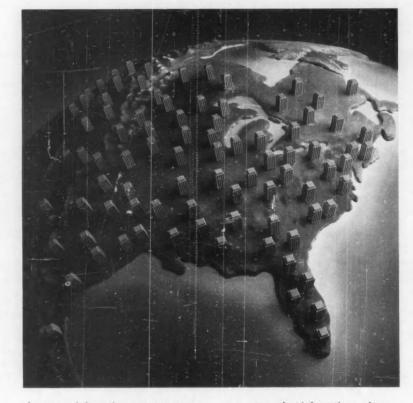
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Interested in DATA SECURITY? Beef up sales skills.

By John A. Blackley

THE JOB OF data security manager isn't what it used to be. These days, holding this title means you spend most of your time roaming the organization, and it often entails much higher level tasks than changing the system's access code. To survive, I tell myself to learn to love change. You're in the data security business, and if you don't love change, you'll go crazy.

I'm a certified information systems security professional and a data security manager at a Texas bank. I have almost 10 years of experience in data security, much of it in the banking and financial services industries.

In the past, security managers often doubled as data security administrators. They spent time entering code in a security system, checking it and submitting it for overnight processing. Now, most of these activities are handled by a data security technician. In my company, this person reports to me, as does the disaster recovery manager.

This change in responsibility has freed me to oversee corporate security standards. I write policies, procedure documents, mission statements and requests for information that will enhance the security program. I visit companywide staff meetings, deliver presentations and gather information about security challenges posed by new technology.

Education is a big part of the job. Most security professionals realize education is the key to effective security: If we spend lots of money on access-control technology and do not educate our staff, we've wasted that money. And excellent negotiating skills are required because almost no one wants to set up another meeting just to hear about security.

At my previous company, I used an unusual negotiating tactic. I had difficulty getting one particular department manager to allow me to talk with his group. I called, wrote letters and did other things to get his attention, to no avail. Finally, I sent him a Valentine's Day card that said, "Forgive me for whatever I've done. Please invite me to one of your staff meetings." And he did.

Nobody wants to hear it

After putting in some necessary time pulling teeth, I have just enough time to research new technology. I must be knowledgeable enough to advise management on security issues before new technology is brought into the company. After all, no wants to hear that the new server can't be brought up on Monday because we don't know how to secure data on it.

I worked at one company that installed a host-to-host communications product. From a security point of view, I told them it was a dog, but they installed it anyway. Afterward, we discovered that any knowledgeable user could easily circumvent some of the product's key security measures. We had to quickly write additional code to prevent this, and fortunately, nothing bad happened. This emphasized to me how important it is to discuss security before, not after, a product is in place.

Talk, talk and more talk
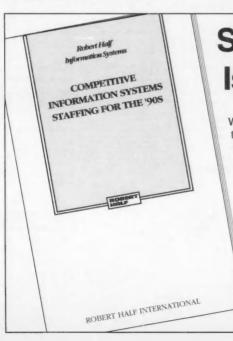
I've found that one of the best ways to educate myself about new technologies is to talk with my peers. Computer security professionals tend to be more isolated in their organizations than other IS professionals and need to seek one another out.

If I do all of the above, I just might keep in tune with my customers. If they're happy, so am I. Right now, the biggest thing my customers want is a product that allows a single user ID and password for all of the computing platforms in the organization. Ask any data security user what they hate most about security, and you'll hear: "We're always being told not to write down passwords. But how do we

A day in the life of one data security manager

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remember all of them when we have so many?" Single sign-on is the answer. Look for security products that promise this, and your customers will love you.

Blackley is a data security manager at a Texas bank.

Can you relate?

Getting comfortable with relational databases is a must if you hope to fit into a distributed environment

By Leslie Goff

NEED to KNOW

You've heard it many times: If you don't want to be left in the dust by distributed computing, you'd better acquire a thorough understanding of relational databases. But where do you begin?

Of course you want to concentrate your energies on the products with the best prospects, and according to George Brown, president of Database Solutions in Marlton, N.J., that means products that are truly relational and have embedded SQL. Beyond that, the choice of products will largely depend on your development environment, experience with fourth-generation languages (4GL), time and budget.

Learning SQL is fairly straightforward. Once you know it, "you can pretty much work your way through any relational database," says Rod Prince, director of technology at National Diagnostic Systems, a medical services consultancy in Burlingame, Calif.

Prince suggests reading SQL manuals for the basics and delving into one package to learn its quirks.

Cobol programmers who have had little or no experience with a graphical user interface (GUI) or the SQL language would probably do best if they started with a product such as MicroFocus Cobol from Dialogue Systems. It is a GUI-based language that makes limited use of object-oriented programming (OOP) techniques and can be used as a front end to a database server environment. But be warned: Price can be an inhibitor. MicroFocus Cobol costs about $1,500 per copy.

To get a good introduction to relational concepts, analysts recommend that you work with Microsoft Corp.'s Access or Borland International, Inc.'s Paradox. Because these products combine a GUI-based, OOP-oriented development environment with the database itself, you can kill two birds with one stone and graduate more easily to database server products.

Take the plunge

Corporate programmers may want to plunge into database servers, says Tim Harmon, workgroup computing strategies program director at Meta Group, Inc., a Westport, Conn.-based consulting firm. Products such as Oracle Corp.'s Oracle, Sybase, Inc.'s Sybase, Informix Corp.'s Informix and SQL Server (marketed by Microsoft and Sybase) were designed to run in a client/server environment.

Database servers must be married to a front-end 4GL development tool, such as MicroFocus Cobol, Powersoft Corp.'s PowerBuilder or Microsoft's Visual Basic, which are used to write the applications that are then ported to the database. Visual Basic provides a consistent interface across all your Windows applications, says Urban Cubbage, a programmer and technical instructor at Paramax Systems Corp. in Sunnyvale, Calif., a division of Unisys Corp.

As you get into the idiosyncrasies of a specific relational database and application development environment, you can evaluate the technical differences among the products. Even when high-level product features are similar, products never take exactly the same approach.

Harmon notes that Paradox has a more OOP-oriented language than does Access. However, several analysts recommend Access as a good starting point because it incorporates a subset of Visual Basic into the scripting language.

On the other hand, PowerBuilder is not a true OOP language, Prince says, but it has OOP components.

Goff is a New York-based free-lance writer.

According to analysts, these are must-do's when learning to use PC databases:

PC database primer

Understand the database utilities. If local-area network databases aren't being administered from a centralized point, programmers must have a good background knowledge of the utilities in the database — import and export procedures, backup and recovery and how to create and drop tables.

Understand locking procedures and isolation levels. Multiuser environments require management of shared resources. You must understand what's locking in the data. You have to be aware of what data resources you are allocating for your transaction.

Understand SQL optimization. You must have good, efficient SQL coding techniques and understand how to obtain and analyze access path information.

Know the capacity issues involved in programming a database. Evaluate the physical I/O capability of the hardware and the resource needs of the application to see if they match.

Understand transaction models. You need a tracking mechanism for live transactions.

Ramp up on mainframe connectivity issues. In a cooperative processing environment, you'll coordinate the database with mainframe data.

Know how to integrate third-party tools. You may want to couple the database with graphics packages or report writers.

Understand OOP. Applications using a GUI need an object-oriented language.

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Give your PC clone a physical exam

By Todd Henschell

FROM THE OUTSIDE, a bargain-priced clone looks like ... well ... another clone. There's no way to know whether the quality is up to par.

For all you know, the vendor may have squeezed a few bucks back into its profit margin with simple system changes that may not be noticeable at first but could contribute to the early demise of the machine.

While most of these problems aren't found on brand-name PCs, small aggressive companies often do whatever it takes to undercut the current market price.

The safest route is to check out a sample machine. A cursory inspection takes only a few minutes and helps avoid irksome bugs, runtime errors and intermittent hardware crashes. Even better, get a written assurance that the systems you order will be equal to or better than the sample's quality.

The diagram to the right is a generic representation of an average PC. Tower cases differ mostly in that they stand upright. More important, if you were to sit on top of a tower case, it shouldn't flex. If the case wobbles, what's inside wobbles, too. That's bad.

■ Once you've pulled the cover, check for support bars on both sides that extend from the front wall of the case to the back wall. If there aren't any, the case will wobble every time it's moved, possibly damaging the motherboard.
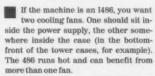
■ Grab the metal where the drives are mounted and try to bend it. If it flexes like a TV dinner tray, you don't want the machine. Every time you push in a floppy, you could flex the drive bays.

■ Examine the cover over the power supply to see if the vents are too close to the flat ribbon cables that supply data to the floppy drive. This is disturbingly common in cheap compact desktop cases. You need enough room to push your hand (about three-fourths of an inch) between them without touching the cable or power supply case.

■ The motherboard should be affixed to the chassis with at least three metal screws: two along the back row where the bus slots are and at least one in front. Larger boards should be mounted with four screws. If the board is mounted with only nylon standoffs and one screw, it may wiggle when you insert cards or during normal thermal cycling.

■ Look at the general arrangement of drive and power cables to be sure they've been properly "dressed" into position. If they're haphazardly placed, that means the system was sloppily constructed.

■ Take a peek at the type of floppy drive (or drives) installed. You want a brand-name drive.

■ If the machine is an I486, you want two cooling fans. One should sit inside the power supply, the other somewhere inside the case (in the bottom-front of the tower cases, for example). The 486 runs hot and can benefit from more than one fan.
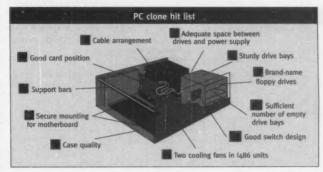
■ Inspect the general rigidity and quality of the case. Are there irregular or sharp edges in areas you will have to access during service? Cheap cases will have no rolled-over edges. Cases with rolled edges are stronger and safer but more expensive to make.

■ Establish that the cards fit into the bus slots correctly and are standing upright. Some bargain machines won't allow the cards to stand at a perfect 90 degree angle in relation to the motherboard.

■ If there are empty drive bays, the installed drives should be spaced apart to permit more air to flow for better cooling. Also, there should be sufficient room for expansion.

■ Look at the front panel of the case. Are the power and reset buttons close to the buttons for ejecting a floppy disk? I've seen cases where they were less than an inch apart. Instead of ejecting a disk, the operator might inadvertently turn the power off.

Henschell is a free-lance writer and PC consultant in Burbank, Calif.

PC clone hit list

- Cable arrangement
- Good card position
- Support bars
- Secure mounting for motherboard
- Case quality
- Adequate space between drives and power supply
- Sturdy drive bays
- Brand-name floppy drives
- Sufficient number of empty drive bays
- Good switch design
- Two cooling fans in I486 units

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Gainers   Losers

Percent

Brooktrout Technology	26.4	Artel Communication Corp.	-23.8
Telematics Int'l Inc.	18.9	Data Race Inc.	-18.2
Dell Computer Corp.	18.3	Anacomp Inc.	-16.7
VLSI Technology	18.0	Group I Software	-15.0
3 Com Corp.	17.7	Netframe	-14.1
Progress Software Corp.	14.0	Comshare Inc.	-13.8
Intelligent Info. Systems (H)	14.0	Micropolis Corp.	-12.5
Banyan Systems Inc.	11.7	Symantec Corp.	-11.8

Dollar

Progress Software Corp.	5.50	Data Race Inc.	-3.50
Motorola Inc.	4.25	Netframe	-2.25
3 Com Corp.	4.00	Cirrus Logic	-2.13
American Power Conversion	3.75	Lotus Development	-2.00
Intelligent Info. Systems (H)	3.50	Symantec Corp.	-1.88
Chipcom Corp.	3.50	Rainbow Technologies Inc.	-1.75
Dell Computer Corp.	3.25	Borland Int'l. Inc.	-1.75
Cabletron Systems	3.25	Aldus Corp.	-1.63

Breaking in

Internetworking equipment — routers, bridges and smart hubs — is the latest industry sector to prove the old adage, "There's no such thing as a free lunch."

Jumping into that booming market is no guarantee of success on Wall Street. While share prices have skyrocketed for market leaders such as **Cisco Systems, Inc.** (CSCO), **Wellfleet Communications, Inc.** (WFLT) and **SynOptics Communications, Inc.** (SNPX), a number of other high-tech issues have languished as companies struggle to carve out a piece of the internetworking market.

Although The Yankee Group predicted the multiprotocol router market will swell to $1.3 billion in 1995, "it isn't necessarily a 'rising tide lifting all boats' situation," said Eric Buck, a senior analyst at Donaldson, Lufkin & Jenrette Securities Corp.

The following companies have tried to diversify into the internetworking market, with varying degrees of success:

• **Proteon, Inc.** (PTON). Proteon's stock started the year at approximately 10 and is currently trading around 5. Analysts said Proteon, which has relied primarily on third-party distributors to move its routers, illustrates the difficulties faced by companies that move into internetworking from other areas.

"The issue with a router sale is that it's not a box sale; it's an expensive product and more of an infrastructure sale," said Doug Carey, a technology analyst at RAS Securities. "It helps for the salesperson to be tied in with the appropriate person in the customer company. Companies that don't focus completely on routers face a big challenge."

• **3Com Corp.** (COMS). 3Com's share price has deflated recently in the face of fluctuations in its key adapter card business. However, 3Com has been relatively effective in expanding into internetworking. The company's router business grew 22% sequentially in the last quarter, according to Maria Lewis, managing director at Cowen & Co. "They don't have a marketing plan to challenge Cisco on the backbone, but I think they're a very viable remote-access solution," Lewis said. 3Com is among the Top 6 vendors in market share in both multiprotocol routers and smart hubs.

• **Telebit Corp.** (TBIT). Telebit, currently trading near its low of 3, moved into internetworking with its NetBlazer dial-up router products. The company still suffers from a high degree of exposure to the enormously competitive, lower margin modem business, according to James Kedersha, an analyst at Cowen & Co. Kedersha said he does not recommend purchasing Telebit stock, but the company has made several moves recently that may strengthen its market position. — *Derek Slater*

Exch	52-Week Range			June 25 3PM	Wk Net Change	Wk Pct Change
COMMUNICATIONS AND NETWORK SERVICES					Up 1.5%	
OTC	40.00	9.63	3 Com Corp.	26.63	4.00	17.7
NYS	81.00	62.75	American Info Techs Corp. (H)	78.50	-0.25	-0.3
NYS	63.88	40.63	AT&T	62.13	0.50	0.8
OTC	4.06	0.75	Artel Communication Corp.	3.00	-0.94	-23.8
OTC	24.50	10.25	Banyan Systems Inc.	16.75	1.75	11.7
NYS	57.50	44.25	Bell Atlantic Corp. (H)	57.50	0.75	1.3
NYS	57.50	46.75	Bellsouth Corp.	54.75	1.13	2.1
NYS	8.00	3.63	Bolt, Beranek & Newman	7.50	0.25	3.4
OTC	18.50	9.50	Brooktrout Technology	13.75	2.88	26.4
NYS	108.38	47.00	Cabletron Systems	104.75	3.25	3.2
OTC	22.75	3.88	Centigram Communications	22.00	2.00	10.0
OTC	43.50	19.00	Chipcom Corp.	42.25	3.50	9.0
OTC	56.25	22.13	Cisco Systems Inc.	53.75	2.50	4.9
OTC	16.38	5.50	Compression Labs Inc.	12.50	-0.13	-1.0
OTC	36.00	11.25	CrossComm	29.00	-0.25	-0.9
OTC	4.63	1.25	Data Switch Corp.	2.63	-0.25	-8.7
NYS	19.88	12.38	Digital Comm. Assoc.	12.50	0.00	0.0
OTC	12.75	4.50	Digital Systems Int'l Inc.	4.75	-0.50	-9.5
OTC	49.50	4.38	DSC Communications (H)	49.50	1.38	2.9
OTC	9.50	4.88	Fibronix Int'l Inc.	6.50	-0.13	-1.9
OTC	24.75	8.75	Filenet Corp.	11.75	0.50	4.4
OTC	4.38	1.50	Gandalf Technologies Inc.	2.88	0.00	0.0
OTC	2.06	0.69	Gateway Communications	1.06	0.00	0.0
NYS	15.75	2.88	General Datacomm Inds.	13.88	-0.38	-2.6
ASE	3.75	2.00	Go Video	2.69	-0.25	-8.5
NYS	37.75	31.63	GTE Corp.	36.25	0.88	2.5
NYS	85.75	62.75	ITT Corp. (H)	83.88	-1.25	-1.5
OTC	57.13	30.75	MCI Communications Corp.	56.38	0.88	1.6
OTC	8.00	2.25	Microcom Inc.	3.50	0.00	0.0
OTC	24.25	4.75	Netrix Corp.	5.25	0.00	0.0
OTC	19.00	8.75	Network Computing Devices	10.00	0.75	8.1
NYS	15.00	5.38	Network Equipment Tech.	7.38	-0.50	-6.3
OTC	20.13	8.00	Network General	9.75	0.63	6.8
OTC	15.75	8.38	Network Systems Corp.	8.50	-0.50	-5.6
OTC	46.25	7.50	Newbridge Networks Corp. (H)	43.25	0.00	0.0
NYS	46.00	30.50	Northern Telecom Ltd.	36.88	-1.38	-3.6
OTC	35.25	22.50	Novell Inc.	27.25	0.75	2.8
NYS	92.50	77.00	Nynex Corp.	87.75	-0.75	-0.8
OTC	22.00	14.50	Octel Communications Corp.	20.75	0.00	0.0
OTC	6.13	3.38	Penril Data Comm Networks	4.13	0.13	3.1
OTC	30.50	10.25	Picturetel Corp.	20.63	0.13	0.6
OTC	15.25	4.63	Proteon Inc.	4.88	-0.25	-4.9
OTC	10.63	2.63	Scientific Atlanta Inc.	10.63	0.88	9.1
NYS	40.75	29.94	Southwestern Bell Corp.	37.25	-0.63	-1.7
NYS	33.75	21.38	Sprint Corp.	33.75	2.00	6.3
OTC	27.00	10.50	Standard Microsystems Corp	15.75	-1.13	-6.7
OTC	18.50	6.88	Stratacom Inc.	11.75	-0.50	-4.1
OTC	42.75	9.75	Synoptics Communications	39.38	1.13	8.6
OTC	7.00	3.63	Telebit Corp.	3.63	-0.38	-9.4
OTC	9.38	2.13	Telematics Int'l Inc.	7.88	1.25	18.9
OTC	25.50	13.38	US Robotics	23.50	1.75	8.0
NYS	45.00	35.25	U S West Inc.	44.75	0.25	0.6
OTC	55.50	12.00	Wellfleet Communications	49.88	3.13	6.7
OTC	15.50	7.00	Xircom	15.50	1.25	8.8
PC'S AND WORKSTATIONS					Up 1.0%	
OTC	5.56	2.50	Advanced Logic Research	3.75	0.00	0.0
OTC	65.25	39.50	Apple Computer Inc. (L)	40.00	-0.75	-1.8
OTC	24.25	11.25	AST Research Inc.	15.00	0.00	0.0
NYS	10.63	2.63	Commodore Int'l.	2.75	-0.13	-4.3
NYS	61.75	24.00	Compaq Computer Corp.	53.63	0.25	0.5
OTC	49.88	16.00	Dell Computer Corp.	21.00	3.25	18.3
NYS	89.25	50.25	Hewlett Packard Co.	82.88	2.13	2.6
NYS	38.50	16.25	Silicon Graphics	36.38	1.63	4.7
OTC	44.00	23.38	Sun Microsystems Inc.	29.38	1.13	4.0
NYS	32.38	22.25	Tandy Corp.	29.00	-1.13	-3.7
OTC	7.00	2.75	Zeos International Ltd.	3.50	-0.38	-9.7
LARGE SYSTEMS					Off 2.0%	
ASE	18.38	4.63	Amdahl Corp.	5.25	-0.13	-2.3
OTC	8.75	4.25	Convex Computer	5.00	-0.63	-11.1
OTC	6.13	1.88	Cray Computer	3.13	0.00	0.0
NYS	30.88	19.00	Cray Research Inc.	26.00	-1.50	-5.5
NYS	13.88	7.50	Data General Corp.	10.00	0.50	5.3
NYS	49.25	30.38	Digital Equipment Corp.	40.75	0.00	0.0
NYS	38.63	26.75	Harris Corp.	37.38	-0.50	-1.3
NYS	100.38	45.88	IBM	49.38	0.00	0.0
OTC	32.00	5.50	Kendall Square Research	16.75	-0.50	-2.9
NYS	127.50	83.00	Matsushita Electronics	118.75	1.38	1.2
OTC	23.75	8.25	Netframe	13.75	-2.25	-14.1
OTC	15.50	9.25	Parallan Computer	12.75	-0.50	-3.8
NYS	19.00	6.00	Pyramid Technology	18.50	0.75	4.2
OTC	24.00	13.75	Sequent Computer Sys.	17.00	-1.38	-7.5
OTC	9.63	1.38	Sequoia Systems Inc.	2.06	-0.19	-8.3
NYS	48.38	29.50	Stratus Computer Inc.	30.63	-0.38	-1.2
NYS	16.88	9.88	Tandem Computers Inc.	11.63	-0.38	-3.1
NYS	21.50	10.63	TriCord Systems (H)	19.88	1.63	8.9
NYS	13.88	7.75	Unisys Corp.	11.50	0.38	3.4
SOFTWARE					Off 1.7%	
OTC	74.00	25.25	Adobe Systems Inc.	66.50	-1.13	-1.7
OTC	20.75	10.25	Aldus Corp.	16.00	-1.63	-9.2
OTC	14.25	5.50	American Software Inc.	7.75	-0.13	-1.6
OTC	28.13	9.75	Ask Computer Systems	10.75	-0.38	-3.4
OTC	56.50	32.75	Autodesk Inc.	52.50	-0.75	-1.4
OTC	13.00	2.50	Bachman Info. Systems	4.50	0.00	0.0
OTC	43.00	32.00	BGS Systems Inc.	32.13	0.13	0.4
OTC	84.13	37.25	BMC Software Inc.	49.50	2.75	5.9
OTC	28.25	17.00	Boole & Babbage	24.25	0.00	0.0
OTC	49.00	17.50	Borland Int'l. Inc.	22.75	-1.75	-7.1
OTC	5.38	3.00	CE Software	3.50	-0.25	-6.7
ASE	30.25	6.25	Cheyenne Software	28.75	-0.38	-1.3
NYS	19.50	8.25	ChipSoft	10.25	-0.25	-2.4
OTC	9.25	5.63	Cognos Inc.	7.00	0.38	5.7
NYS	31.38	11.13	Computer Associates	28.38	0.75	2.7
OTC	12.38	2.75	Computervision Corp.	3.63	-0.25	-6.5
OTC	34.25	19.25	Compuware Corp.	25.75	-0.63	-2.4
OTC	14.75	5.75	Comshare Inc.	6.25	-1.00	-13.8
OTC	12.75	10.75	Corel Corp.	16.50	-0.25	-1.5
OTC	23.00	5.25	Easel Corp.	11.75	0.63	5.6
OTC	25.25	12.00	4th Dimension	18.50	0.38	2.1
OTC	19.50	5.38	Frame Technology	5.75	-0.13	-2.1
OTC	20.75	8.50	Group I Software	8.50	-1.50	-15.0
OTC	35.25	17.50	Gupta	17.50	1.50	9.4
OTC	8.75	3.75	Hogan Systems Inc.	7.75	0.25	3.3
OTC	25.75	11.25	IMRS	18.63	0.38	2.1
OTC	36.00	19.00	Information Resources	35.00	-0.75	-2.1
OTC	24.88	6.06	Informix Corp.	23.75	0.50	2.2
OTC	16.75	8.88	Intergraph Corp.	9.38	-0.50	-5.1
OTC	13.63	6.88	Interleaf Inc.	8.50	-0.13	-1.4
OTC	18.00	5.50	Intersolv Inc. (L)	5.88	-0.38	-6.0
OTC	16.00	7.75	Knowledgeware Inc.	9.75	0.38	4.1
OTC	54.75	26.00	Legent Corp.	35.75	2.25	6.7
OTC	37.00	14.75	Lotus Development	32.50	-2.00	-5.8
OTC	23.00	6.50	MathSoft	7.25	0.50	7.4
OTC	23.25	5.25	McAfee Associates	7.25	0.50	7.4
OTC	11.63	1.88	Meca Software	10.00	-0.25	-2.4
OTC	12.00	5.25	Mentor Graphics	10.38	-0.25	-2.4
OTC	46.00	27.25	Micro Focus	31.75	-1.63	-4.9
OTC	17.25	4.38	Micrografx Inc.	6.00	0.50	9.1
NYS	98.00	65.50	Microsoft Corp.	87.75	-1.50	-1.7
OTC	46.00	3.88	Oracle Corp.	46.00	2.75	6.4
OTC	34.25	15.38	Parametric Technology	29.75	-0.50	-1.7
OTC	40.50	22.50	Peoplesoft	29.50	0.50	1.7
OTC	7.13	3.50	Phoenix Technologies	5.38	-0.25	-4.4
OTC	40.00	22.00	Powersoft	27.50	-0.25	-0.9
OTC	25.00	17.00	Platinum Software	23.50	-1.50	-6.0
OTC	25.00	11.25	Platinum Technology	12.25	-1.13	-8.4
OTC	61.50	32.25	Progress Software Corp.	44.75	5.50	14.0
OTC	12.50	2.56	Quarterdeck Office Sys.	3.38	0.06	1.9
OTC	28.25	11.75	Rainbow Technologies Inc.	6.75	-1.75	-6.5
OTC	12.25	4.00	Rasterops	8.63	-0.88	-9.2
OTC	15.25	5.63	Ross Systems	12.50	-0.25	-2.0
OTC	27.50	9.25	Sapiens Intl. Corp. N.V.	25.50	0.00	0.0
OTC	14.50	6.75	Software Publishing Corp.	7.13	-0.38	-5.0
OTC	22.00	2.00	Software Toolworks Inc.	14.50	0.75	5.5
OTC	3.50	0.75	Spinnaker Software	1.19	-0.06	-5.0
OTC	12.75	3.25	State of the Art	8.75	-0.75	-7.9
NYS	24.63	14.63	Sterling Software Inc.	18.50	-1.00	-5.1
OTC	21.50	8.00	Struct. Dynamics Research	16.38	-1.13	-6.4
OTC	72.50	22.75	Sybase Inc.	72.50	2.63	3.8
OTC	40.00	5.88	Symantec Corp.	14.00	-1.88	-11.8
OTC	12.50	5.25	Systems Center Inc.	9.88	-0.50	-4.8
OTC	25.50	10.00	System Software Assoc.	19.25	-0.75	-3.8
OTC	6.38	2.50	Trinzic Corp.	3.00	-0.38	-11.1
OTC	22.75	9.13	ViewLogic Systems	18.75	1.25	7.1
OTC	23.50	6.75	Walker Interactive Systems	7.25	-0.25	-3.3
OTC	3.19	1.38	Wordstar	1.56	-0.06	-3.8
SEMICONDUCTORS					Up 0.0%	
NYS	32.88	7.38	Advanced Micro Devices	21.50	0.75	3.6
NYS	21.38	9.38	Analog Devices Inc.	18.88	-0.38	-1.9
OTC	24.63	0.50	Atmel Corp.	24.63	0.50	2.0
OTC	7.25	2.75	Chips and Technologies	3.38	-0.25	-6.9
OTC	39.75	13.00	Cirrus Logic	17.50	-2.13	-10.8
NYS	14.50	7.38	Cypress Semiconductor Corp (H)	13.00	-0.63	-4.6
OTC	60.63	27.13	Dallas Semiconductor	13.75	-1.00	-6.8
NYS	15.50	4.88	Intel Corp.	54.75	-0.75	-1.4
OTC	33.25	13.75	LSI Logic Corp. (H)	15.00	0.38	2.6
NYS	36.63	13.63	Lattice Semiconductor	25.75	-1.50	-5.5
NYS	88.00	7.38	Micron Technology (H)	36.13	1.88	5.5
NYS	16.25	8.50	Motorola Inc.	85.63	4.25	5.2
OTC	16.50	6.50	National Semiconductor	16.25	-0.50	-3.2
OTC	43.25	22.25	Sierra Semiconductor	7.00	-0.50	-6.7
NYS	70.88	34.50	SynOpsys	43.00	2.75	6.8
OTC	9.00	6.00	Texas Instruments	68.50	-1.13	-1.6
OTC	10.38	3.13	VLSI Technology	9.00	1.38	18.0
ASE	9.63	3.75	Weitek	8.63	-0.50	-5.5
OTC	38.50	14.50	Western Digital Corp. (L)	3.75	-0.25	-6.3
OTC	33.00	13.00	Xilinx	36.50	2.13	6.2
			Zilog Inc.	28.75	2.50	9.5
PERIPHERALS AND SUBSYSTEMS					Off 0.0%	
OTC	39.25	11.75	American Power Conversion	37.75	3.75	11.0
NYS	17.75	0.00	Banctec Inc.	17.75	0.00	0.0
OTC	18.00	9.75	Camber Corp. (L)	5.75	-0.75	-11.5
OTC	18.38	6.50	Cognitronics Corp.	7.13	-0.63	-8.1
NYS	25.50	9.25	Conner Peripherals Inc.	9.38	-0.50	-5.1
OTC	38.50	10.75	Creative Technologies Inc.	27.75	-0.13	0.5
OTC	30.75	14.25	Data Point Corp.	15.75	-3.50	-18.2
ASE	17.00	4.75	Dataram Corp.	9.00	0.13	1.4
NYS	20.63	5.06	EMC Corp. (H)	20.63	1.88	10.0
OTC	10.50	5.38	Emulex Corp.	6.75	-0.25	-3.6
OTC	19.00	13.25	Evans & Sutherland	15.50	-0.50	-3.1
OTC	33.00	9.25	Exabyte (L)	26.75	-2.00	-7.5
OTC	28.50	7.09	Intelligent Info. Systems (H)	28.50	3.50	14.0
OTC	8.88	3.75	Iomega Corp.	4.13	0.13	3.1
OTC	21.25	5.75	IPL Systems Inc.	6.25	0.25	3.2
OTC	19.63	5.88	Maxtor Corp.	6.63	0.13	1.9
OTC	11.25	5.75	Micropolis Corp.	6.13	-0.88	-12.5
NYS	117.00	95.38	3M Corp	108.00	-0.30	-0.3
OTC	7.75	4.00	Printronix Inc.	6.88	0.00	0.0
NYS	17.25	6.88	QMS Inc.	9.00	0.13	1.4
OTC	17.88	9.75	Quantum Corp. (L)	11.38	0.75	7.1
OTC	12.75	3.13	Radius Inc.	4.00	0.00	0.0
OTC	16.50	7.63	Recognition Equipment	14.38	0.50	3.6
OTC	13.88	4.75	Rexon Inc.	4.25	0.00	0.0
OTC	22.38	12.00	Seagate Technology	15.38	-0.25	-1.6
NYS	45.00	18.00	Storage Technology	35.50	-1.00	-2.7
NYS	27.88	16.88	Tektronix Inc.	24.38	0.38	1.6
NYS	88.88	66.75	Xerox Corp.	79.50	2.13	2.7
SERVICES					Off 1.0%	
OTC	23.75	14.25	American Mgmt. Systems	16.00	-0.50	-3.0
NYS	4.75	2.50	Anacomp Inc.	2.50	-0.50	-16.7
OTC	35.75	16.25	Analysts Int'l	29.13	1.00	3.6
NYS	56.13	38.75	Auto Data Processing	48.13	0.88	1.9
NYS	17.25	11.53	Ceridian Corp.	14.75	0.25	1.7
NYS	17.38	13.13	Comdisco Inc.	14.38	-0.13	-0.9
OTC	7.88	3.75	Computer Horizons	7.75	0.38	5.1
NYS	80.50	57.00	Computer Sciences	78.63	0.88	1.1
NYS	9.25	6.50	Computer Task Group	7.00	-0.25	-3.4
NYS	40.50	22.00	CompUSA Inc.	32.88	1.00	3.1
OTC	14.25	6.00	Corporate Software	11.00	-1.00	-8.3
OTC	19.25	7.38	Egghead Discount Software	8.38	0.13	1.5
NYS	35.88	25.25	General Motors E (EDS)	30.63	0.50	1.2
NYS	25.50	9.50	Inacom Corp.	20.75	0.25	1.2
OTC	15.38	6.50	Intelligent Electronics	12.75	-0.13	-1.0
OTC	10.50	8.63	Merisel	10.50	-1.00	-8.7
OTC	16.25	5.75	Microage Inc.	15.50	-0.75	-1.6
OTC	43.00	22.00	Paychex	39.00	0.00	0.0
NYS	87.25	32.88	Policy Management Sys.	36.63	0.63	1.7
NYS	38.50	16.81	Reynolds and Reynolds	36.38	0.50	1.4
OTC	37.00	30.00	SEI Corp.	30.75	-0.13	-0.4
OTC	24.38	13.75	Shared Medical Systems	23.00	0.00	0.0
OTC	12.63	5.75	SHL Systemhouse	10.50	-0.38	-3.4
OTC	29.25	18.25	Software Spectrum Inc.	29.00	0.25	0.9
OTC	33.75	22.50	Sungard Data Systems	30.25	0.00	0.0
NYS	4.38	1.13	Ultimate Corp.	3.25	-0.25	-7.1

Computer Industry

New kid on management block

Start-up's software tracks and manages systems across enterprise network

By Johanna Ambrosio
SADDLE BROOK, N.J.

■ One of the computer industry's newest players is trying to dent the market for software used to manage computers throughout an enterprise.

Called Novadigm, the upstart recently showed off its wares in seminars across the country. Headed by two former Pansophic, Inc. managers, the company has a war chest of almost $7 million in start-up capital and has about 10 paying customers for Enterprise Desktop Manager (EDM), its family of client/server software management packages. Another 15 customers are slated to begin trials shortly, according to H. Kent Petzold, president and chief executive officer.

Prudential Securities, Inc. in New York helped Novadigm develop EDM during the past two years and plans to use it to help distribute and manage software on the more than 10,000 workstations going into its branch offices nationwide.

"We're changing our environment from dumb terminals to intelligent workstations," said Mohammed Mosaad, senior vice president of Prudential. "We want to be able to manage everything from our central site in New York. This product is very important to us."

Novadigm's Albion Fitzgerald: *Managing diversity is key*

EDM is a collection of systems management software, including applications to handle security, asset management, change management, configuration management and distribution of PC software from a central site.

Novadigm officials said that when a user changes the desktop configuration, or if a new version of software needs to be distributed, EDM can handle such changes either automatically or on demand.

The applications run across multiple platforms, including IBM mainframes, OS/2 and Windows; Unix support is planned within the next 12 months.

Similarly, EDM supports communications protocols such as IPX, NetBIOS, Transmission Control Protocol/Internet Protocol and IBM's Systems Network Architecture.

At the core of EDM is an object-oriented architecture that includes a server, client and an administrator component. The server contains a proprietary database that configures and manages software based on company policies.

Users can integrate their existing systems management software into EDM, including IBM RACF mainframe security and NetView network management, and can also integrate into EDM data repositories from other third-party suppliers. Prices are $25,000 for the server and administrator and $100 per client. All the systems

management applications are included with the core system.

The main idea behind EDM is to provide a tightly integrated set of applications that can track and manage software across an entire enterprise. "It's a question of managing diversity," said Albion Fitzgerald, Novadigm's chairman and chief technology officer.

Good potential

One outside observer gave Novadigm — which stands for "new paradigm" — a good chance of success. "The founders have a proven track record, have good funding, and the technology is pretty sophisticated," said Igor Stenmark, an analyst at Gartner Group, Inc., a consulting firm in Stamford, Conn. "They're providing a policy-based mechanism for controlling desktops and services."

At the same time, however, Novadigm is battling a bevy of well-entrenched competitors on all fronts.

Many vendors are trying to get a piece of the enterprise systems management market, including traditional players such as Candle Corp., Legent Corp. and Computer Associates International, Inc.; start-ups Emprise Technologies in Pittsburgh and Openvision Corp. in Pleasanton, Calif.; hardware suppliers Novell, Inc. and IBM; and application software vendors such as Microsoft Corp.

Novadigm was founded in 1990 and has 22 employees. The company plans to sell EDM through direct sales and value-added resellers, among other channels.

Amdahl, EDS ally to provide cross-platform development

By Melinda-Carol Ballou
DALLAS

Amdahl Corp. and Electronic Data Systems Corp. have formed a venture to provide users with tools to handle cross-platform application development in areas ranging from business rules to work-flow analysis.

Known as the Antares Alliance Group, the venture will oversee ongoing development and integrate Amdahl's Huron prototyping development tools and EDS' InCase and Apache modeling software by mid-1994.

The two companies seek to leverage EDS' clout as a systems integrator and the complementary features of their product sets to

At a glance

Amdahl holds an 80% interest in Antares, and EDS holds the remaining 20%.

Competitive computer-aided software engineering market leaders include TI's Information Engineering Facility, Andersen Consulting's Foundation (a division of Arthur Andersen & Co.) and Sapiens International Corp.'s Sapiens tools.

target users wanting a single source to define, develop, test and execute applications.

Industry analysts were positive in their assessments of the benefits of uniting the products, though they said Antares will face a challenge in effectively marketing them. After two years of shipping Huron, for instance, Amdahl was only able to gain a user base of 50. Breaking into an arena saturated with development tools was no easy task for a company that has mainframes as its primary business.

More irons in fire

EDS also has competing alliances to juggle. For example, EDS is currently bidding on a number of

projects in which it plans to use Texas Instruments, Inc.'s IEF application tool kit, which competes with Antares.
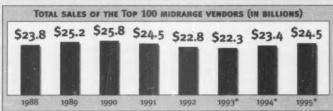
Huron is a prototyping tool that allows access to multiple databases for its proprietary database repository. It also provides the ability to externalize business rules and build them into applications, said Jim Sinur, an analyst at Gartner Group, Inc., a consulting firm in Stamford, Conn. And InCase offers modeling capabilities that are lacking in Huron, he said. EDS' Apache offers the ability to incorporate work flow in applications.

"If they build bridges across those three, they will have one of the few products that covers the whole life cycle from business rules through to work-flow analysis," he said. Antares officials said they will use Amdahl's and EDS' direct sales channels and indirect channels such as third parties, OEMs and value-added resellers.

INDUSTRY PULSE: Midrange systems

The recent surge of Unix-based client/server systems being installed has caused an upturn in what was a shrinking midrange market
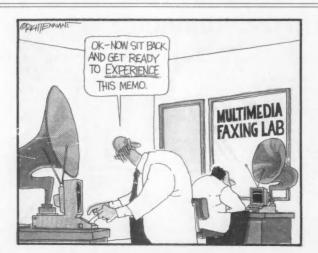
TOTAL U.S. SHIPMENTS (IN THOUSANDS)

1988	1989	1990	1991	1992	1993*
205.6	153.3	157.1	142.5	149.8	155.6

TOTAL SALES OF THE TOP 100 MIDRANGE VENDORS (IN BILLIONS)

1988	1989	1990	1991	1992	1993*	1994*	1995*
$23.8	$25.2	$25.8	$24.5	$22.8	$22.3	$23.4	$24.5

TOP 5 VENDORS BY U.S. SHIPMENTS

1991 MEDIUM SYSTEMS		1991 SMALL SYSTEMS	
IBM	3,150	IBM	30,115
DEC	2,807	DEC	23,313
HP	1,181	NCR/AT&T	11,808
DG	1,060	Unisys	9,070
Sequent	543	Sun	7,895
1992 MEDIUM SYSTEMS		**1992 SMALL SYSTEMS**	
IBM	4,866	IBM	31,820
DEC	1,535	DEC	24,915
DG	772	HP	10,787
HP	670	Sun	7,970
Tandem	630	NCR	7,159

IDC defines midrange systems as those that comprise both small-scale (those costing $10,000 to $100,000 and supporting two to 32 users) and medium-scale (those costing $100,001 to $1 million and supporting 33 to 128 users) systems.

*Projected

Source: International Data Corp. (IDC), Framingham, Mass.; Gartner Yardstick, Stamford, Conn.

The 5th Wave by Rich Tennant

OK—NOW SIT BACK AND GET READY TO EXPERIENCE THIS MEMO.

MULTIMEDIA FAXING LAB

Seeking advice

KnowledgeWare's corporate execs were strategizing in Colorado last week on how best to reorient the company, which is expected to post a loss of at least $14 million after restructuring charges for the fiscal year ending June 30, according to Drew Brosseau, an analyst at Cowen & Co. As a cost-savings measure, Knowledge-Ware will close its corporate office in Atlanta for two weeks next month. Other observers report Softlab has reopened negotiations to acquire the maker of application development tools [CW, April 6, 1992]. KnowledgeWare officials refused to comment on the report. They did say, however, that they have completed layoffs and have stabilized the number of employees at 830.

Licensing at work

Microsoft is reportedly close to signing on to use DEC's upcoming Polycenter software licensing technology as a utility within Windows NT, although the deal is apparently taking a bit longer to close than DEC had hoped. DEC originally wanted to go public with it this week but is now looking toward a mid-July consummation. The company hopes to have endorsements from other platform vendors by then as well, although industry watchers are not sure DEC can pull that off. The Polycenter license manager, code-named Omni and due later this year, will compete primarily with Gradient Technologies' iFOR/LS technology (formerly called Net/LS).

Northern exposure

If Canada is the great frontier for outsourcers these days, then Northern Telecom may be the next case in point. The telecommunications giant will soon choose between Computer Sciences Corp. and IBM subsidiary Integrated Systems Solutions Corp. for a deal that one source valued at around $3 billion. Merrill Lynch analyst Steve McClellan estimated that the winner will purchase approximately $180 million in computer assets from Northern. It will be interesting if ISSC wins because Northern is a large Hewlett-Packard shop. EDS, which was busy trying to close its erstwhile British Telecom deal, was never in the Northern picture, according to sources.

Not so North-bound

Although Litton Computer Services announced last month that it was negotiating a seven-year deal to take over operations of the North reservation system for Hilton Hotels Corp. and Budget Rent A Car Corp., it conceded recently that Budget may not be around for the long haul. Thomas Schoen, Litton vice president of business development, said he expects Budget to stay on for at least two years, but beyond that he is less certain. Sources said Budget might prefer to move off the 20-year-old North system, which was designed more for hotels than for car rental companies, and onto a next-generation system. Litton is slated to replace AMR as North's operater next month.

Two-way street

An expected agreement between IBM, Maxtor Corp., Seagate Technology, Inc., Toshiba Corp. and SunDisk Corp. to make their PCMCIA hard drives interchangeable has been delayed. Sources said the deal is now targeted for a mid-July announcement [CW, May 31].

What's in a name? Depends on the spelling. The latest issue of CompuServe Magazine played with anagram programs and ran some of the more amusing ones. For example, you might not think President William Clinton and talk show host Rush Limbaugh have much in common, but their anagrams, Million Lawn Tic and Hi Bug Arm Lush, aren't so far apart. In the computer industry, No Such Jelly has been in the news a lot as he hands over the reins at Apple, whose best-known product is the Sham Tonic. Bug Bile, meanwhile, is the dominant mainframe maker's nickname, and Big Stella wants as many people to run Windows as possible. Phone, fax or CompuServe News Editor Alan Alper with news tips at (800) 343-6474, (508) 875-8931 or 76237,2413, respectively. Or try Computerworld's 24-hour voice-mail tip line at (508) 820-8555.